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Revision of the Afrotropical species of *Graptomyza* Wiedemann (Diptera: Syrphidae: Volucellini)[1]

by

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ABSTRACT

A key to the genera of Volucellini is presented and the phylogenetic relationships of its included taxa are analysed. *Graptomyza* Wiedemann, 1820 is diagnosed and the possible mimicry of meliponid bees by *Graptomyza* species is discussed. The Afrotropical species of *Graptomyza* are revised and a key to these species is given. Five species groups are established, each diagnosed separately; the Afrotropical distribution of each group is plotted. Twenty one species are considered, 16 of which are described or redescribed; three species remain undescribed pending the availability of further material, while *G. hova* Keiser, 1971 and *G. quadrifaria* Szilády, 1942 are treated as *incertae sedis*. Six new species are described (*G. amplicavum*, *G. clarala*, *G. lutea*, *G. nigricavum*, *G. pallidinotata* and *G. summa*). *G. liberiae* Greene, 1949 is newly synonymised with *G. triangulifera* (Bigot, 1883). *G. mitis* Curran & Bryan, 1926 (formerly believed to be African) is Australian and is therefore excluded from the revision. Lectotypes are designated for *Graptomyza aurea* Bezzi, 1915, *G. nigra* Bezzi, 1915 and *Microdon varius* Walker, 1849.

INTRODUCTION

The tribe Volucellini is poorly represented in the Afrotropical Region, with only two of the four genera recorded from there. Of these only *Graptomyza* Wiedemann, 1820, is speciose. The second genus, *Ornidia* Lepeletier & Serville, 1828, is a New World taxon, the tramp species *O. obesa* (Fabricius, 1775) having moved into the Old World tropics probably through human activities (Thompson 1991). Even though *Graptomyza* is indigenous in the Afrotropical Region, it is still quite poorly represented there (19 species, excluding two species treated as *incertae sedis*) compared to the 40 known from the Oriental Region (Knutson, Thompson & Vockeroth 1975), and the total of 83 described species. This total can be considered incomplete since the Australasian, Oceanian and Oriental species require revision.

Afrotropical *Graptomyza* species were last revised by Bezzi (1915), who described three new species and synonymised two older names, bringing the total to eight species. Since then six further species have been described. A new species found in South Africa and Lesotho by Dr B. R. Stuckenberg prompted work on the genus in 1990, at which time it was decided to undertake a revision and analysis of the Afrotropical species.

In this revision six new species are described and three new species left undescribed, because of a lack of adequate specimens. *G. mitis* Curran & Bryan, 1926 was ostensibly described from South Africa, although a more precise type locality was not published due to the lack of data labels. I have seen a single specimen identified as *G. mitis* (compared with the holotype) from CNCI with the label 'Stradbroke Id Qld' [26°55'S:152°19'E]. This confirms Curran's 1927 statement that *G. mitis* may be an Australian (Queensland) species erroneously recorded from the Afrotropical Region. Specimens of *G. hova* Keiser, 1971 and *G. quadrifaria* Szilády, 1942 were not examined, since the unique holotypes were unobtainable. Since no specimens could be matched to the descriptions, these species remain unplaced. I recently (Whittington 1991) inadvertently published three new Afrotropical species names of *Graptomyza*; these names are unavailable and are thus *nomina nuda* (*G. summa*, *G. ambiloba* and *G. spiniferia*).

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Little is known about the larval and pupal stages of *Graptomyza*, except that the larvae of some species have a saprophagous habit, developing in fruits and pods. As a consequence this study is based entirely on adult morphology.

TECHNIQUES

All descriptions are based on holotypes, unless otherwise indicated. Variable character states are detailed (in parentheses) within the description. Measurement ranges, eg. of body and wing lengths, are given in parentheses after those of the holotype, for all material examined. However, with very large collections of a single species, ranges are based on samples of specimens from each end of the size range.

Bilaterally symmetrical features are described in the singular. Body length was measured from the apex of the antennal tubercle, in a straight line to the apex of the abdomen (extended genitalia excluded); in cases where the abdomen was deflexed, the head and thorax measurement was added to that of the long axis of the abdomen. Wing length was measured from the base of the costa to the wing tip. The frons to head width ratio (henceforth abbreviated as 'FH ratio') is the ratio of the width of the frons at the antennal tubercle to the maximum width of the head across the eyes. Separate measurements are given for males and females in *G. signata* (Walker, 1860) only, where sexual dimorphism is striking. Measurements of scutellar depressions are based on the area demarcated by setae within the depression.

Terminology and abbreviations generally follow McAlpine (1981) and Vockeroth & Thompson (1987). In addition the abbreviations A.s.1, A.s.2 and A.s.3 have been used for the first to third antennal segments.

The term 'macrosetae' is used throughout to distinguish those setae which are more robust and usually longer than the surrounding setae. These large setae are frequently called bristles, but this term has not been used to maintain consistency with McAlpine (1981). The following macrosetae are recognised: npl – notopleural, anepst – anepisternal, spal – supra-alar, pal – post-alar, ipal – intrapost-alar, sctl – scutellar. Spines are considered to be stout, usually short, setae. Illustrations exclude all but the dominant spines, macrosetae and, on occasion, setae.

The facial concavity is the concave area of the head between the antennal base and the facial tubercle. The terms 'outer and inner sacculus' refer to the pit of the sacculus organ which is usually basally positioned on A.s.3 in lateral view (Figs 7 & 8). This structure, not previously used in the taxonomy of Volucellini, has proved to be a useful character. The pit is easily observed with the antenna *in situ* on the specimen. Measurements are based on the dimensions observed, at 625×, of the subsided area forming the pit. In the volucellines examined, there is a wide range of states, varying interspecifically.

A protective curved collar at the end of T4 (in both sexes) is termed the genital shield. Genitalia were cleared in hot potassium hydroxide, then viewed and stored in glycerine. Drawings were made with the aid of a Wild M5 stereomicroscope and a Wild 1,25× drawing tube. The terms basiphallus and distiphallus have been used to indicate, respectively, the main stem of the aedeagus and the hood-like lobe dorsal to this. Use of these terms is not intended to give the impression of segmentation and in some cases the dorsal lobe (distiphallus) is fused to the ventral aedeagus (basiphallus).

Details in 'Additional material examined' have been standardised, so that localities are listed by country, from north to south and west to east. The locality (with latitude and longitude in square brackets if not provided on the data label) is given first, followed by date, collector, any other relevant details and lastly the institutional coden (refer to Acknowledgements). Label data of non-type specimens are not usually cited exactly as they appear on the label. Dates conform to the format 'day.month.year', with the day and year in Arabic numerals and the month in lower case Roman (eg. 8.iii.1991). Label data of primary types and specimens with apparently incorrect locality data are quoted verbatim with forward slashes between lines and semicolons between labels. Where labels share similar data, these are included in one entry, with all dates and collectors for that locality listed and separated by commas.

Scanning electron microscopy was conducted on a Jeol T200 and a Hitachi S-570, at 8 and 10 Kv, with prior sputter coating with gold-palladium, using a Polaron E5100 sputter coater.

The cladogram of genera in the Volucellini was derived using the 'ie- tplot' function in HENNIG86 (Farris 1988). Groundplan and out-group character sets were established following the examination of the species listed under 'Cladistic analysis of volucelline genera' (see below).

The Afrotropical species of *Graptomyza* are allocated to species groups based on diagnostic characters, ie. characters common to all members of a particular group. In addition characters common to a group and to one or more other groups have been listed under 'Additional characters'.

TRIBE VOLUCELLINI

The Volucellini, a tribe of Milesinae, is recognised by the possession of a straight or recessive M_1 (Fig. 1) and plumose arista. As noted by Thompson (1972), the presence of macrosetae, the basal position of r-m (Fig. 1), the poorly developed metasternum, and untoothed or shortly spined hind femora, indicate

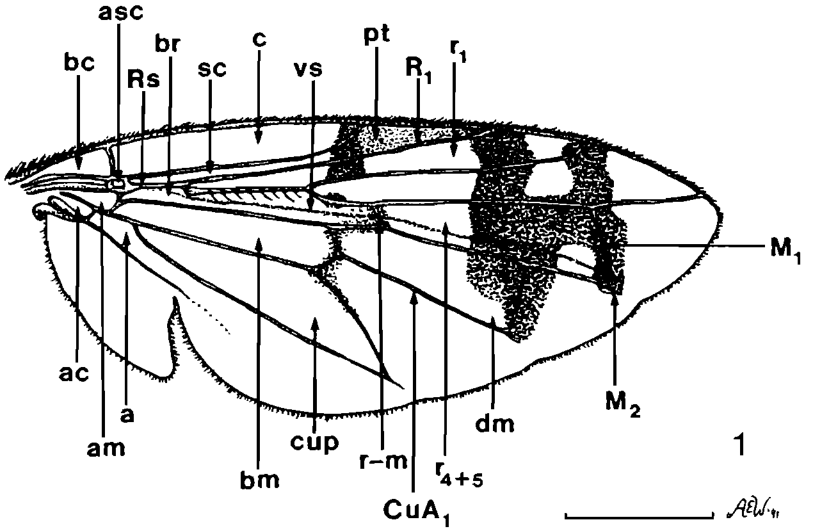


Fig. 1. *Graptomyza signata* right wing, dorsal view. a = anal cell, ac = anterior anal cell, am = anterior median cell, asc = anterior subcostal cell, bc = basal cell, bm = basal median cell, br = basal radial cell, c = costal cell, CuA$_1$ = first anterior branch of cubitus vein, cup = posterior cubital cell, dm = discal median cell, M$_1$ = first medial branch, M$_2$ = second medial branch, pt = pterostigma, r-m = radial-medial cross vein, R$_1$ = anterior branch of radial vein, r$_1$ = first radial cell, r$_{4+5}$ = fourth and fifth radial cell, Rs = radial sector vein, sc = subcostal cell, vs = *vena spuria*. (Scale bar = 1 mm).

the relatively plesiomorphic position of this tribe within the Milesinae.

The Volucellini comprise: *Volucella* Geoffroy, 1762, *Graptomyza* Wiedemann, 1820, *Ornidia* Lepeletier & Serville, 1828, and *Copestylum* Macquart, 1846. Numerous genus-group names have been proposed for *Copestylum*, all of which have been synonymised, mostly by Thompson (1972), Thompson *et al.* (1976) and Thompson (1991). The four genera are distinguished in the following key.

Key to genera

1 Scutellar depression well developed and setose ... **Graptomyza** Wiedemann

– Scutellum smooth or at most slightly depressed, and then always asetose .. 2

2 One median and two sublateral facial tubercles; notopleuron posteriorly extended with more than seven macrosetae .... **Ornidia** Lepeletier & Serville

– Median facial tubercle poorly developed or absent, sublateral tubercles absent; notopleuron not extended with six or fewer macrosetae 3

3 Anterior anepisternum setose, male paramere spinose and epandrium basally lobate (Fig. 2a) .... **Volucella** Geoffroy

– Anterior anepisternum bare, male paramere aspinose and epandrium basally lacking lobe (Fig. 5a) .... **Copestylum** Macquart

Recognition of genera

Graptomyza is unique among Syrphidae in that the scutellum has a well-defined, setose depression (Fig. 9). Similarly, *Ornidia* is distinguished from other

Syrphidae by the three facial tubercles. *Volucella* and *Copestylum* are less easily distinguished. The character state 'anterior anepisternum bare' was previously used (Thompson 1972, Vockeroth & Thompson 1987) to delimit the Nearctic volucellines (which have this area bare) from the Old World species (which have this area setose). This pleurite is sometimes pilose and frequently obscured by both head and posterior anepisternal setation in *Copestylum*, although removal of the head reveals the pleurite. The terminalia character states suggested in the above key (couplet 3) are, similarly, far from adequate, but nevertheless apply to the species of *Volucella* examined (see under cladistic analysis, below), except that *V. inanis* (Linnaeus, 1758) lacks the epandrial lobe. The spinose state in *Volucella* should not be confused with the apically pointed anterior lobe of (for example) *C. marginatum* (Say, 1830) (Fig. 5a). The following species currently placed in *Copestylum* also have the paramere spinose and the epandrium lobate: *C. belinda* (Hull, 1949), *C. haagii* (Jaennicke, 1867), *C. neotropicum* Thompson, 1976 and *C. trituberculatum* Thompson, 1976. These findings indicate that some species are currently misplaced in *Copestylum* and possibly *Volucella*. Vockeroth & Thompson (1987) stated that the two genera can be distinguished biologically in that larvae of *Volucella* are scavengers in nests of colonial Hymenoptera, while those of *Copestylum* develop in decaying plant material, especially Cactaceae. These are, however, poor characters for use in a morphologically based key and it is clear that few larval habits have been established for these genera. As noted by Thompson (1991), *Copestylum* is in need of revision. Furthermore, the fact that *Copestylum* has no defining character state(s), is clearly shown in the cladistic analyses of Thompson (1991) and that provided below.

Cladistic analysis of genera

In the following cladistic analysis, the groundplan character states (Table 1) were established by adding to and modifying Thompson's (1991) character set, and by comparison with a wider out-group than Thompson (1991) used (see below). The tribe Cheilosini was chosen as the out-group at the tribal level in accordance with the view that Callicerini + Volucellini + Cheilosini represent a group of primitive syrphids (Thompson 1972). Although members of the Cheilosini have two-

TABLE 1

Volucelline groundplan character set

	Characters (as defined in text)																	
Taxa	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Ancestor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Graptomyza	1	1	1	0	0	1	0	0	0	2	0	1	0	0	0	1	0	0
Volucella	0	2	1	1	0	0	0	1	1	0	1	2	1	1	0	0	1	1
Ornidia	0	2	0	2	1	0	1	1	1	1	2	2	1	0	1	0	0	0
Copestylum	0	2	0	1	0	0	0	1	1	0	0	2	1	0	0	0	0	0

segmented aedeagi, unlike Callicerini and Volucellini which have plesiomorphic unsegmented aedeagi, the Cheilosini were chosen because placement of the tribe Callicerini remains problematic (Thompson 1972). No members of the Callicerini were examined for out-group characters.

Specimens of the following species were examined in the preparation of groundplan character sets (genera A–D) and out-group character sets (genera E–H). Brackets are not used to indicate change in generic combination.

A *Copestylum* (*anna* Williston, *avidum* Osten Sacken, *belinda* Hull, *dracaena* Curran, *fornax* Townsend, *haagii* Jaennicke, *isabellina* Williston, *lentum* Williston, *marginatum* Say, *macrocephalum* Giglio-Tos, *metalliferum* Walker, *mexicanum* Macquart, *neotropicum* Thompson, *obscurius* Curran, *pallens* Wiedemann, *pseudotachina* Hull, *pusillum* Macquart, *satura* Osten Sacken, *scutellatum* Macquart, *smithae* Thompson, *tamaulipanum* Townsend, *trituberculatum* Thompson, *vagum* Wiedemann, *vittatum* Thompson, *willinki* Fluke);

B *Graptomyza* (all revised Afrotropical species plus *brevirostris* Wiedemann, *flavicollis* Ferguson, *flavorhyncha* Hull, *inclusa* Walker, *longirostris* Wiedemann, *maculipennis* de Meijere, *microdon* Osten Sacken, *mitis* Curran & Bryan, *nigripes* Brunetti, *plumifer* Ferguson);

C *Ornidia* (*obesa* Fabricius);

D *Volucella* (*bombylans* Linnaeus, *inanis* Linnaeus, *inflata* Fabricius, *pellucens* Linnaeus, *plumatoides* Hervé-Bazin, *zonaria* Poda);

E *Cheilosia* (*albitarsis* Meigen, *barbata* Loew, *bergenstammi* Becker, *canicularis* Panzer, *frontalis* Loew, *honesta* Rondani, *illustrata* Harris, *impressa* Loew, *lenis* Becker, *pagana* Meigen, *pallipes* Loew, *pictipennis* Egger, *proxima* Zetterstedt, *scutellata* Fallén, *variabilis* Panzer, *vernalis* Fallén, *vulpina* Meigen);

F *Ferdinandea* (*cuprea* Scopoli);

G *Pelecocera* (*tricincta* Meigen);

H *Rhingia* (*caerulescens* Loew, *campestris* Meigen, *fuscipes* Bezzi, *lutea* Bezzi, *mecyana* Speiser, *pellucens* Bezzi, *pulcherrima* Bezzi, *pycnosoma* Bezzi, *trivittata* Curran).

Groundplan characters

The groundplan characters on which the cladogram is based (Table 1), are defined in the following list. Plesiomorphic states are coded as [0] and established as such by comparison with the out-group (genera E–H, above). In cases where more than one state exists in the out-group, plesiomorphy was taken as the state most frequently encountered. Linear coding was used for all characters, which were then treated additively. Characters marked * are modified from Thompson (1991).

0* Male head holoptic [0] or dichoptic [1]. The plesiomorphic state was found to be consistent in the specimens of *Copestylum* examined (see above), even though Thompson (1991) found one species group (unspecified) with the dichoptic condition.

1* Arista bare [0], pubescent [1] or short plumose [2]. The plesiomorphic condition is found in *C. pseudotachina* (Hull, 1930), although all other members of the genus have a plumose arista. In *Graptomyza*, the condition varies from pubescent (found in the majority of species examined) to long plumose (eg. *G. longirostris*); the pubescent condition was accepted as the groundplan character state for *Graptomyza*.

2* Anterior anepisternum bare [0] or pilose [1]. Although members of *Graptomyza* have the anterior anepisternum only partially pilose, the pilose condition for the genus is accepted as the ground plan character.

3 Notopleuron with 2 or fewer macrosetae [0], 3–6 macrosetae [1] or more than 7 macrosetae [2]. The plesiomorphic state is based on the majority of specimens seen from the out-group, although there are several examples where the number of macrosetae is greater than 2 (*R. pycnosoma*, *C. canicularis*, *C. pictipennis*, *C. variabilis*, *F. cuprea*).

4 Notopleuron smoothly convex and not extended posteriorly [0] or lobate and extended posteriorly [1].

5* Katepisternum evenly setose [0] or medially bare [1].

6* Anepimeron bare posteriorly [0] or entirely setose [1].

7* Katepimeron bare [0] or setose [1].

8* Postalar wall bare [0] or setose [1].

9* Scutellar depression absent [0], poorly defined with setation similar to that on scutellum [1] or well-defined with long setation [2].

10* Cell R_{2+3} open [0], petiolate [1] or apically bulbous [2]. Thompson (1991) refers to cell R_{4+5}, but upon examination of specimens, I believe R_{2+3} was intended. I have accepted his ground plan character state [0] for *Copestylum*.

11* M_1 processive [0], straight [1] (Fig. 1) or arcuate and strongly recurrent [2]. *G. suavissima* Karsch, 1888 is an exception in the genus, having M_1 slightly recurrent.

12* M_2 present [0] (Fig. 1) or absent [1].

13* Larvae saprophagous [0] or specialised inquilines in colonial hymenopteran nests [1].

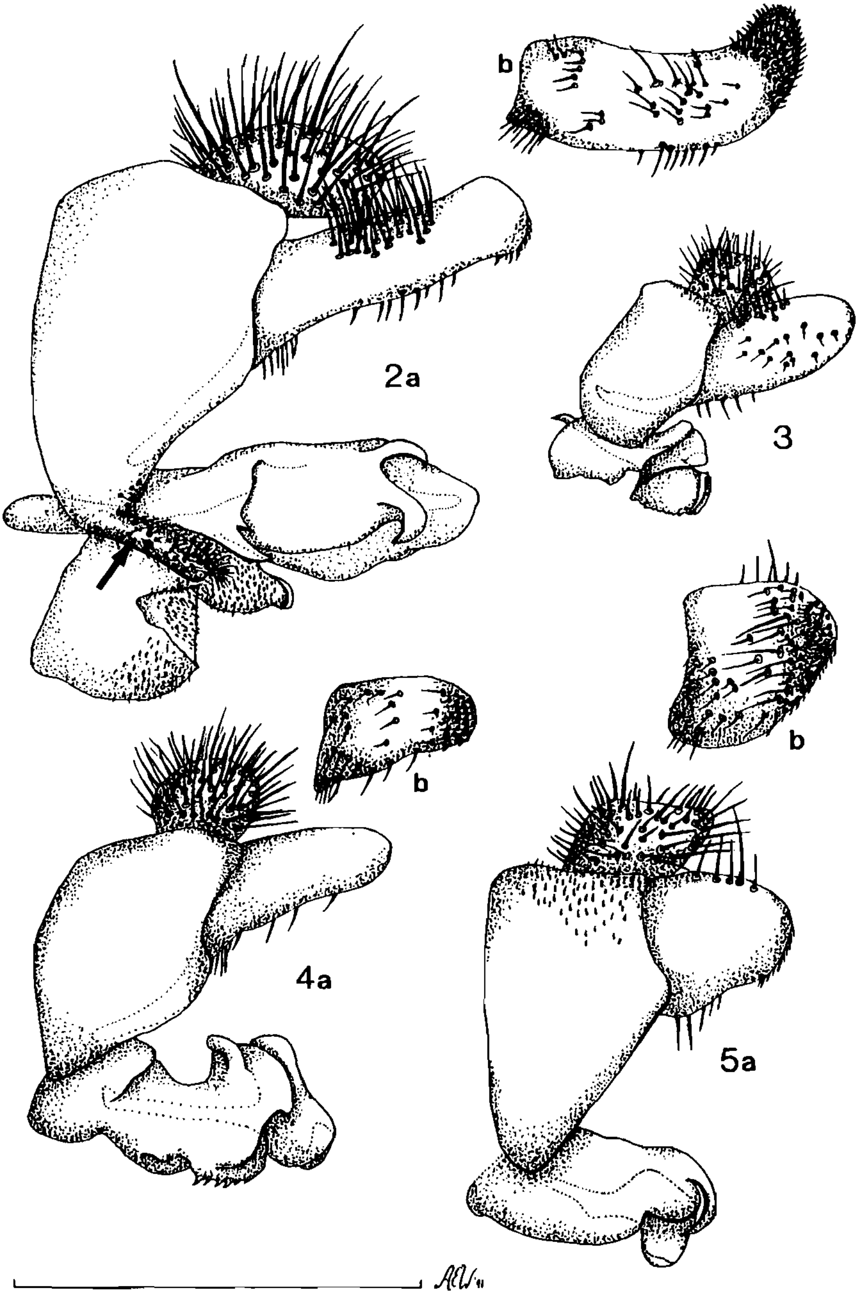
14 Single facial tubercle [0] or median and 2 lateral tubercles [1].

15 A.s.3 short (length less than twice width) [0] or elongate (length twice width) [1]. *G. perforata* van Doesburg, 1960 and *G. summa* sp. n. from the Afrotropical Region have the plesiomorphic condition, but most species of *Graptomyza* have the apomorphic state.

16 Male paramere unarmoured (Figs 3–5a) [0] or bearing spines (Fig. 2a) [1].

17 Basal epandrial lobe absent (Figs 3–5a) [0] or present (Fig. 2a) [1].

The character state matrix was examined and the cladogram (Fig. 6) generated, using implicit enumeration, identifying one tree of minimum length (ie-) in the program 'Hennig86' (Farris 1988). The resultant cladogram differs from that proposed by Thompson (1991) in that *Copestylum* branches off from the *Volucella–Ornidia* group. Although *Copestylum* has no defining character states, it is here separated by the fact that *Ornidia* and *Volucella* share the petiolate R_{2+3} cell, while *Copestylum* has the plesiomorphic open state.



Figs 2–5. Male genitalia of Volucellini. 2. *Volucella pellucens*. a. Lateral view (epandrial lobe arrowed). b. Surstylus, inner view. 3. *Graptomyza longirostris*, lateral view. 4. *Ornidia obesa*. a. Lateral view. b. Surstylus, inner view. 5. *Copestylum marginatum*. a. Lateral view. b. Surstylus, inner view. (Scale bar = 1 mm).

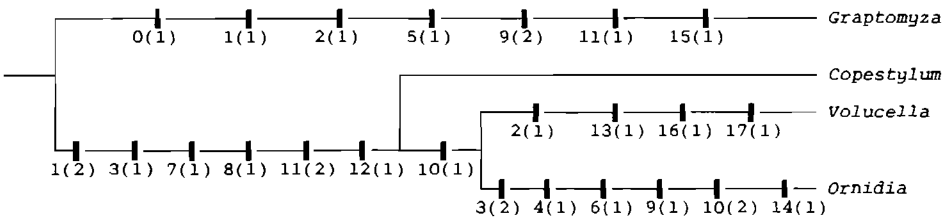


Fig. 6. Cladogram for the genera of Volucellini. **I** indicates apomorphies. Consistency index = 92; retention index = 77; trees = 1.

Genus *Graptomyza* Wiedemann, 1820

Graptomyza Wiedemann, 1820: 16. Type species: *Graptomyza longirostris* Wiedemann, 1820, by original designation (on plate).

Graptomyza Henning, 1832: 382 [preoccupied by *Graptomyza* Wiedemann, 1820]. Type species: *Graptomyza longicornis* Henning, 1832: 382, by original designation.

Baryterocera Walker, 1857: 123. Type species: *Baryterocera inclusa* Walker, 1857, by monotypy.

Ptilostylomyia Bigot, 1883: cxiv. Type species: *Ptilostylomyia brevirostris* Wiedemann, 1820, by subsequent designation (Knutson *et al.* 1975).

Protograptomyza Hull, 1949: 351 (*Graptomyza* subgenus). Type species: *Graptomyza doddi* Ferguson, 1926, by original designation.

Etymology: Gr.γραπτός (graptos) = painted or marked, Gr. μυζός (myzos) = sucker. Gender female.

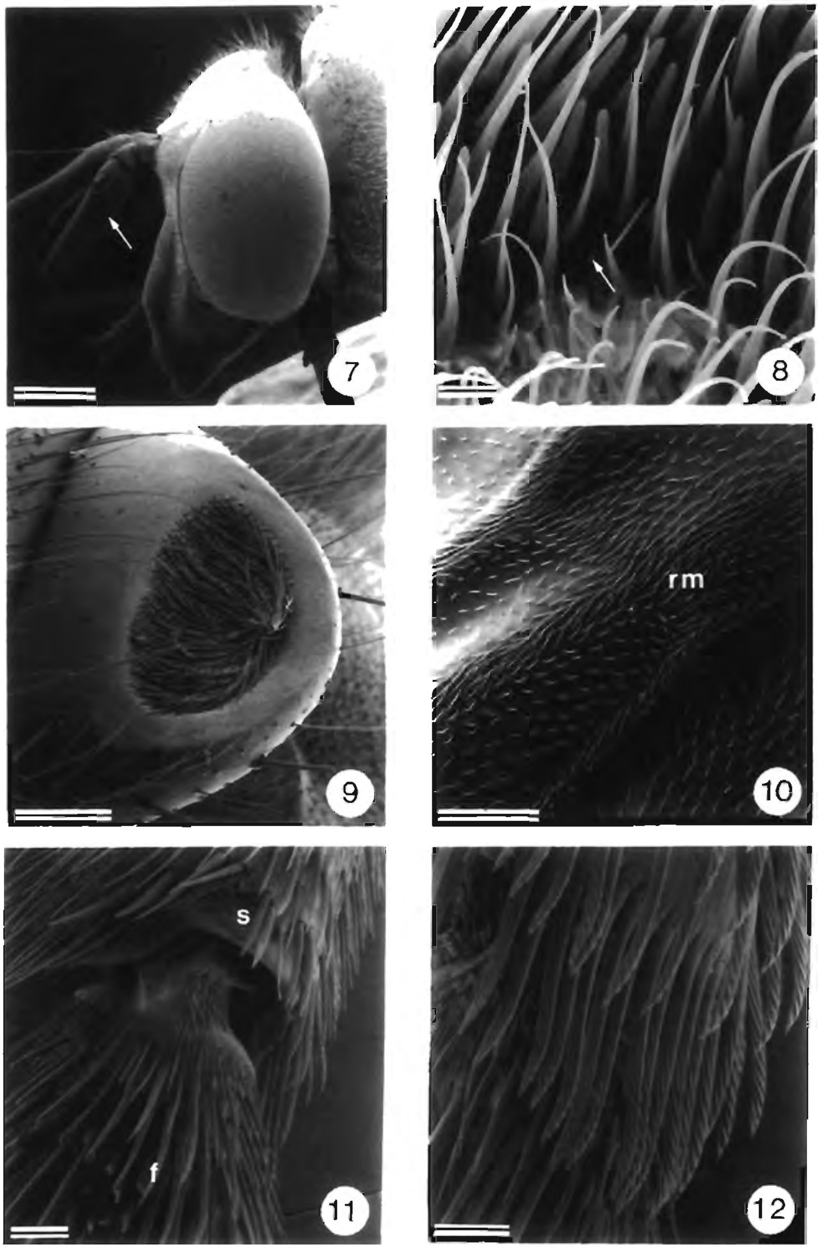
Diagnosis (based on species listed for groundplan character set): Head dichoptic in both sexes, broader than thorax, length in dorsal view much shorter than head width. Frons slightly depressed medially. Epistome produced anteroventrally, conical (Fig. 7). A.s.3 elongate (length greater than width) (Fig. 7). Notopleuron with 2 or fewer macrosetae. Katepisternum medially bare. Postalar wall bare. Scutellum with well-defined depression filled with long setae (Fig. 9). M_1 straight. Cell r_{4+5} petiolate. *Vena spuria* only evident as a fold through br and r_{4+5} (Fig. 10) and nodal bulges at bases of Rs and R_{4+5}. Lateral margins of abdomen conspicuously convex.

Additional characters (shared by all Afrotropical species groups examined, unless specified for particular species):

Integument glossy.

Head: Frons concave medially. Epistome deeply notched at apex. A.s.1 and A.s.2 with apical crown of setae and 1 dorsal macroseta at apex of A.s.2 (Fig. 7). Outer sacculus of A.s.3 (Figs 7 & 8) basally orientated. Head with setae as long as A.s.1, longest on postgena, becoming shorter on postocellar region. Postocellar setae black, short.

Thorax: Anterior declivity of scutum bare. Scutum with 2 dc bands of erect or proclinate setae, conspicuously contrasted with vestiture, extending to transverse suture or beyond (best viewed from dorsoposterior angle). 3–4 spal, 3 pal and 1 ipal macrosetae. Long setae on hind margin of scutum between ipal. Setation of pleurites as follows (except for *G. summa*, see description): bare on anterior anepst and kepm, centre of mr and kepst, posterior anepm (except small central pruinose area); long on pprn lb, prepst, ktg, anatg, anterior anepm, posterior



Figs 7–12. *Graptomyza signata* (scanning electron micrographs). 7. Head, lateral view (arrow = pit of sacculus organ; scale bar = 0,5 mm). 8. Sacculus pit (arrow = sensilla; scale bar = 5 µm). 9. Setose scutellar depression (Scale bar = 0,2 mm). 10. *vena spuria* at node with r-m (Scale bar = 100 µm). 11. Tibio-tarsal articulation (s = small spines, f = flattened setae on basitarsus; scale bar = 50 µm). 12. Tibia, ventral setae arranged in comb-like arrays (Scale bar = 25 µm).

anepst and kepst (margin), patch anterior to p spr; pruinose on mtepst and mtepm, anterior kepst, margins of mr and posterior kepm. Costal setae decreasing in length towards wing apex, more evenly spaced and paler beyond apex (Fig. 1). Macrosetae along Rs (Fig. 1) (absent in *G. summa*). M and CuA_1 straight each side of dm. Wing membrane with microtrichia on dorsal and ventral surfaces (Fig. 10), distribution unrelated to infuscation (except in *G. suavissima* where microtrichia are predominantly on areas of infuscation); microtrichia absent on at least basal cells bc and am and base of bm. Calypters pale, with pale brown border and fringe of short, pale setae, intermingled on margin of lower calypter with long, branched setae. Plumule poorly developed, brown basally, pale distally. Hind tarsus with ventral patch of dense setae of 2 types: flattened setae intermingled with cylindrical setae (Fig. 11); arrays of ventral combs of setae (Fig. 12). Pulvillus with ventral surface setose and pale. Empodium finely plumose.

Abdomen: Alveoli raised. Longest setae on anterolateral margin of T2. T4 ending in curved collar (=genital shield).

Discussion: The distribution of *Graptomyza* is tropical to subtropical in Africa and in the Indo-West Pacific Region (Fig. 13). There are apparently no species found between Simla District (northwestern India) and Imatong in southern

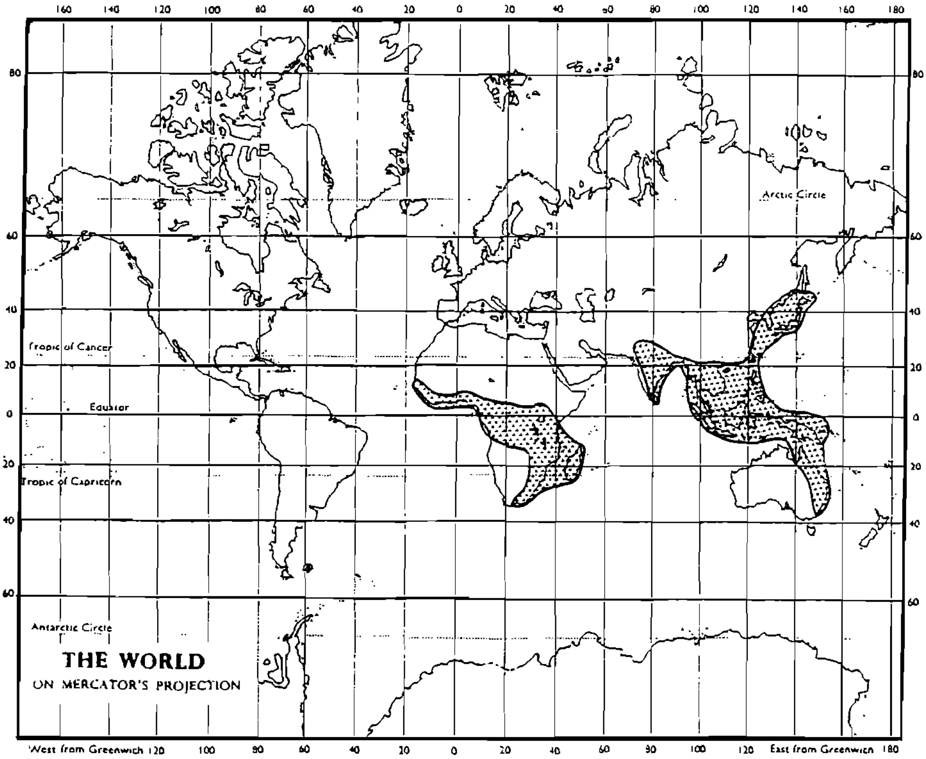

THE WORLD
ON MERCATOR'S PROJECTION
Arctic Circle
Tropic of Cancer
Equator
Tropic of Capricorn
Antarctic Circle
West from Greenwich
East from Greenwich
160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180
80 60 40 20 0 20 40 60

Fig. 13. World distribution of *Graptomyza*.

Sudan, due to the aridity of the intervening Iranian Plateau and Arabian Peninsula. The association of North African and Indian species has historic links, since the African and Indian plates retained close faunal relationships until late Cretaceous-Palaeocene times (Briggs 1989). Thus the present intervening barrier of aridity has prevented dispersal between the two previously linked faunae, suggesting that the Afro-Indian plate was originally the centre of endemism.

Northward expansion is prevented in Africa by the Sahara desert, and in Asia by the deserts of Turkestan and Takla Makan in the west, and by the Himalayas and the Gobi desert further east. In the Far East the distribution has extended northwards along the coastal regions and island chains from Taiwan to Japan and southern Far-east Russia. No species are known on the mainland between North Vietnam and southern Far-east Russia. Within the Afrotropical Region, *Graptomyza* has a distinctly moist tropical to subtropical distribution (Figs 38, 80, 125 & 132). No specimens are recorded from arid regions; in Africa apparently regions of less than 250 mm of precipitation per annum.

No morphological characters were found that could clearly separate the Afrotropical species from the Oriental, Australasian and Oceanian faunae. Thus Afrotropical *Graptomyza* cannot be established as a monophyletic group. Provisionally, I have divided the species into species groups, which are to be viewed in the Afrotropical context only, because various character states used to establish these groups are shared by some Oriental and Australasian members of the genus. In agreement with Griswold (1991), cladistic analyses cannot be used for groupings delimited by geographic and political boundaries only, but should rather be based on monophyletic taxa. Thus, until a full revision of all species of *Graptomyza* can be undertaken, a more rigorous grouping of species and further statements regarding phylogeny and biogeography cannot be made.

Little is known about the habitat preferences of the Afrotropical taxa. Several species are recorded from mainly forested localities (eg. the Madagascan *robusticornis* species group), but the majority tend to be found in more open *Acacia*-savannah habitats (*varia* species group), or montane grassland (*perforata* species group).

It has been mentioned in the literature that adult *Graptomyza* are mimics of meliponine bees (Hull 1949), but mimicry in the genus remains to be confirmed. The theory is refuted here, because it is based on morphological similarity, with no supporting biological evidence. Although the tribe Meliponini (Apidae: Apinae) has a mainly tropical distribution, it is especially abundant in tropical America and southeast Asia, with most of the Old World tropical species being small in size and few in number (Michener 1974). Morphological similarity and the partly coincident distributions of *Graptomyza* and Meliponini (abundant in southeast Asia, sparse in Africa), do not necessarily confirm mimicry.

Furthermore larval development suggests that no evolutionary pressure exists that would facilitate a mimetic relationship between the two groups. Thompson (1972) proposed two phylogenies, based on whether larvae of *Graptomyza* had saprophytic feeding habits or scavenged in colonial hymenopteran nests. Had the latter case been found to be correct, then the hypothesis for mimicry may have been sound, since ovipositing females would require access to the hymenopteran nest.

Thompson (1991) accepted the saprophytic nature of the feeding habits, indicating that the diphyletic nature (Thompson 1972 Fig. 3b) of the Old World volucellines (*Graptomyza* and *Volucella*) should be accepted. In addition, the small size of *Graptomyza* individuals may be appropriate for fast development in ephemeral food resources, eg. *G. signata* has been reared from tomato and unspecified rotting fruit, *G. triangulifera* (Bigot, 1883) from unspecified pods and an undetermined Australian (Huonbrook, New South Wales) species (near *G. flavicollis* Ferguson, 1926) from fallen fruit of *Castanospermum australe* A. Cunningham.

In comparison, *Volucella* adults are larger and have strong mimetic associations with *Bombus* species, with larvae developing as inquilines within the less ephemeral food resource in the nests of the models. Batesian mimicry appears to be operative in adult *Volucella*, but not in adult *Graptomyza*. Mimicry is difficult to establish from dry specimens and until further biological evidence is forthcoming, it cannot be determined whether a more generalised form of mimicry is involved, such as that found in the syrphid genus *Eumerus* Meigen, 1822, which has a general resemblance to small Hymenoptera.

Key to Afrotropical species of *Graptomyza*

1 Body mostly dark blue (iridescent on abdomen; head orange); frons markedly depressed; without notopleural macrosetae; 1 pair scutellar macrosetae (Fig. 127); microtrichia on wing membrane predominantly in areas of infuscation; cell dm with adjacent veins (M and CuA$_1$) curved outwards at apex (Fig. 128); M curved towards wing margin at M$_2$ such that M$_1$ is re-entrant (Fig. 128); leading edge of T2 (dorsal view) with small cluster of black macrosetae (Fig. 130); genital shield well developed, with 2 lateral and a smaller median spine **suavissima** Karsch

– Body yellow (or orange) and black (or brown); frons slightly or not depressed; 1–3 pairs notopleural macrosetae; 2 or more pairs scutellar macrosetae (Figs 22–25, 43, 65–68 & 109–115), if none (Fig. 44) then body colouring orange and brown; microtrichia throughout wing membrane irrespective of areas of infuscation; cell dm with adjacent veins (M and CuA$_1$) straight (Fig. 1); M$_1$ straight (Fig. 1); leading edge of T2 without small cluster of black macrosetae; genital shield poorly developed or if well developed then without spines ... 2

2 Dark band on epistome not reaching base of antennae (frontal view); 1 anepisternal macroseta; more than 2 pairs of scutellar macrosetae (Figs 22–25) [*robusticornis* species group] 3

– Dark band on epistome either reaching base of antennae or completely absent (frontal view); 2 anepisternal macrosetae, 2 or fewer pairs of scutellar macrosetae (Figs 43 & 44, 65–68 & 109–115) 6

3 Epistome elongate (Fig. 15); wing without bands (Fig. 31); abdomen mostly dark (lacking patterns) with indistinct blue iridescence .... **clarala** sp. n.

– Epistome ending bluntly below facial tubercle (Figs 14, 16 & 17); wing with banding in apical half (Figs 30, 32 & 33); abdomen brown and ochre (or white) patterned (Figs 34–36) 4

4 Three macrosetae each side of facial tubercle (Fig. 17); outer sacculus large and oval, one-quarter A.s.3 width (Fig. 17); meron pale to dark brown ....
robusticornis van Doesburg

– Two (sometimes 1) macrosetae each side of facial tubercle (Figs 14 & 16); outer sacculus small and circular, much less than one-quarter A.s.3 width (Figs 14 & 16); meron black 5

5 Antenna uniform grey (Fig. 14); scutellar depression large, the long axis more than half the length of scutellar base (Fig. 22) ....
amplicavum sp. n.

– Antenna bicoloured (grey above, ochre below) (Fig. 16); scutellar depression moderate, the long axis less than half the length of scutellar base (Fig. 24) .....
pallidinotata sp. n.

6 Facial tubercle with pronounced callosities (Figs 39 & 40); frons flat [*perforata* species group] 7

– Facial tubercle smoothly conical (Figs 50–54 & 81–87); frons slightly depressed in front of ocellar triangle 8

7 Head without bands on gena and across facial tubercle (Fig. 40); frons wide (FH ratio 0,45:1); outer sacculus oval and basally positioned with proximal margin infolded (Fig. 40); no macrosetae each side of facial tubercle (Fig. 40); thorax with macrosetae inconspicuous, absent on scutellum (Fig. 44); scutellar depression moderate and shallow, long axis more than one-third length of scutellar base (Fig. 44); Rs lacking small macrosetae (Fig. 46); all femora dark brown; genital shield poorly developed .... **summa** sp. n.

– Head with band over facial tubercle reaching base of antennae; frons narrow (FH ratio 0,34:1); outer sacculus circular and positioned midway on width of A.s.3, with proximal margin slightly raised above level of distal margin (Fig. 39); 3 macrosetae each side of facial tubercle (Fig. 39); thorax with 1 npl, 1 anepst, 3 pal, 3 spal, 1 ipal and 2 sctl conspicuous macrosetae; scutellar depression small and deep, long axis one-quarter length of scutellar base (Fig. 43); 8–9 small macrosetae on Rs (Fig. 45); only hind femora dark brown; no genital shield .... **perforata** van Doesburg

8 Hind tibia with macrosetae but no spines (or few weakly developed basal spines); abdomen largely dark; male with middle basitarsus dilated into flat disc (Figs 60–64) [*aurea* species group] 9

– Hind tibiae with series of stout anteroventral spines in addition to macrosetae (Figs 95–97, 99 & 100), if spines inconspicuous (Figs 98 & 101) then abdomen always with brown chevron markings (Figs 116–121); male with middle basitarsus cylindrical [*varia* species group] 13

9 Dark pattern on frons forming 3 lobes reaching eye margin (Figs 56 & 57) and width of abdomen (Figs 73 & 74) less than width of thorax; arista with vestiture dorsally only; male with width of mid basitarsus slightly more than that of tibia (Figs 61 & 62) 10

– Dark pattern on frons forming 2 lobes reaching eye margin (Figs 55 & 59), if with third pale lobe (Fig. 58) then width of abdomen greater than width of thorax (Figs 72 & 75); arista with vestiture dorsally and ventrally; male with width of mid basitarsus twice that of tibia (Figs 60, 63 & 64) 11

10 Wing distinctly patterned (Fig. 70); length of abdomen much less than twice width; abdomen dark brown, patterned with ochre (Fig. 73); male with mid basitarsus expanded proximally to slightly more than width of tibia (Fig. 61) **breviscutum** Curran

– Wing faintly patterned with very pale brown over marginal crossveins; length of abdomen slightly more than twice width (Fig. 74); abdomen orange brown patterned with ochre; male with mid basitarsus expanded distally to slightly more than width of tibia (Fig. 62) .... **lutea** sp. n.

11 Facial tubercle with 3 callosities (Fig 53); outer sacculus dorsally positioned (Fig 53); pile of thorax pale intermingled with dark setae; scutellum bicoloured (Fig. 68); male with mid basitarsus broadly expanded proximally and less so distally (Fig. 63) .... **nigra** Bezzi

– Facial tubercle with single callosity (Figs 50 & 54); outer sacculus positioned midway on width of A.s.3 (Fig. 50); pile of thorax and abdomen golden; scutellum uniformly pale (Fig. 65); male with mid basitarsus broadly expanded into a round plate (Figs 60 & 64) 12

12 Frons bicoloured (Fig. 55); epistome straight-sided (dorsal view); pprn lb yellow; scutellar depression with long axis 0,20 times length of scutellar base; wing membrane with brown pattern (Fig. 69) .... **aurea** Bezzi

– Frons tricoloured (Fig. 59); epistome indented between eye margin and tip of epistome (dorsal view); pprn lb white; scutellar depression with long axis 0,15 times length of scutellar base; wing membrane without pattern .... Undescribed sp. 1

13 Dark genal band broad (Fig. 82), curving along epistome margin; in dorsal view dark lobe on frons nearest the antennae not reaching eye margins, but separated by band of yellow (sometimes narrow) (Fig. 89); facial concavity of male very wide and flat, bright yellow and lacking band over facial tubercle; frons of male wide, FH ratio 0,45-0,48:1, in female 0,37–0,40:1 ...... **signata** (Walker)

– Dark genal band narrow (Figs 81, 83–87), terminating at tip of epistome; in dorsal view dark lobe on frons nearest antennae reaching eye margin (Figs 88, 90–94); facial concavity of male not wide, band over facial tubercle reaching base of antennae in both sexes; frons narrow in both sexes, FH ratio less than 0,35:1 14

14 Scutellar depression filling most of scutellum, narrowly bordered (Fig. 109); medial dark markings of abdomen forming continuous band on T2 to T4 (Fig. 116) .... **nigricavum** sp. n.

– Scutellar depression broadly bordered (Figs 110–115); medial dark markings of abdomen discontinuous on T2 to T4 (Figs 118–121) 15

15 One npl and 4 spal macrosetae; all femora dark; spines on hind tibia weak (similar to macrosetae) and apically positioned (Fig. 98) .... **varia** (Walker)

– Two npl and 3 spal macrosetae; 1 or no femora dark; spines of hind tibia stout (dissimilar to macrosetae) and at least some medially positioned (Figs 97, 99–101) 16

16 Hind tibia with few spines (Figs 99 & 101) 17

– Hind tibia with many spines (Figs 97 & 100) 18

17 All femora pale; scutellar depression without marginal row of inwardly directed setae; scutellum brown medially (proximal to depression) and pale laterally (Fig. 113) .... **xanthopoda** Bezzi

– One pair of femora dark; scutellar depression with row of inwardly directed setae along posterior margin; scutellum brown proximal to depression over entire width (Fig. 115) .... Undescribed sp. 3

18 Outer sacculus small, much less than one-quarter A.s.3 width; medial dark marking on T2 forming a closed triangle (Fig. 118) .... **triangulifera** (Bigot)

– Outer sacculus large, one-quarter A.s.3 width; medial dark marking on T2 forming an inverted 'V' (Fig. 120) .... Undescribed sp. 2

robusticornis species group

Diagnosis: Brown facial band over tubercle not reaching antennal socket. Facial tubercle with moderate callosity. One anepst macroseta and more than 2 pairs sctl macrosetae. Distal end of hind tibia and tarsomeres each bearing a row of comb-like setae, up to 3 combs on basitarsus and 4 on second and third tarsomeres.

Additional characters (shared by all members of this species group, but also present in other species groups):

Facial concavity well developed and bare. Occiput and vertex dark brown to black. Antennal tubercle bordered with brown. Aristal vestiture shorter than width of arista at base. A.s.3 dark grey, with silver pruinosity. Setation of eye pale golden. Row of thickened and slightly longer setae differentiated from vestiture at anterior margin of scutum. 2 dc bands of reversed setae reaching beyond transverse suture. 2 npl macrosetae; sctl macrosetae intermingled with black setae. Subscutellum with silver pruinescence and convex upper lobe. Recumbent setae of scutellar depression raised at hind margin, forming distinct tuft. Setation of legs pale golden intermingled with black to dark brown setae over darkened integument, conspicuously longer on posterior margins. Hind tibia with ventral spines (Figs 26–29). Wing with ac cell lacking microtrichia. Genital shield poorly developed, spineless.

Included species: *G. amplicavum* sp. n., *G. clarala* sp. n., *G. pallidinotata* sp. n. and *G. robusticornis* van Doesburg, 1957.

Distribution: Madagascan, located on the moister eastern half of the island (Fig. 38), favouring montane rain forest.

Graptomyza amplicavum sp. n.

Figs 14, 18, 22, 26, 30, 34 & 38

Etymology: L. *amplus* = large, L. *cavum* = depression, referring to the large size of the scutellar depression.

Body length: 6,20 (6,07–6,33) mm; wing length: 5,73 (5,33–5,80) mm.

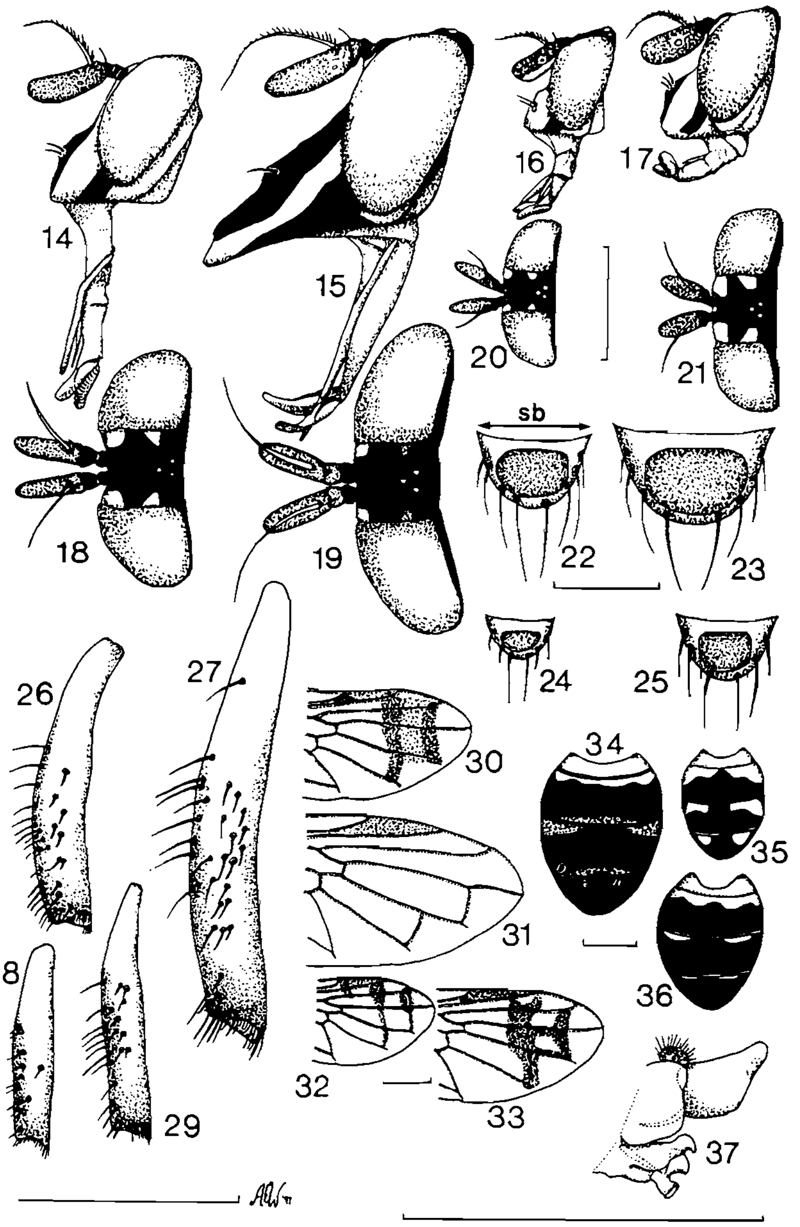
Head (Figs 14 & 18): Yellow with black markings on frons, bands across gena along epistomal margin to clypeus and small dot below eye. Facial tubercle gibbose with 2 bumps. Epistome blunt, not projecting beyond facial tubercle. Eye dark brown with moderately long pile. FH ratio 0,30:1 (0,29–0,33:1). A.s.1 and A.s.2 black. Arista brown, pale basally, vestiture longer than width at base. A.s.3 blunt apically, 2,50 (2,30-2,80) times longer than wide. Outer sacculus buff, circular, small with diameter 0,03 mm (0,02–0,03 mm), deep, situated one-third from base and midway on width of A.s.3 with proximal margin slightly raised. Inner sacculus slit-like, 0,03 (0,05 in first paratype) × 0,02 mm, basally positioned at lower edge of A.s.3. Setae: sparse on face and gena, black on vertex, frons, facial and antennal tubercles; 2 strong, black setae each side of facial tubercle.

Thorax: Presutural area dark brown (orange brown in second paratype) with indistinct orange brown marks, postsutural scutum orange brown with 2 indistinct dc dark brown lines (lacking in first paratype); black between transverse suture and first spal macroseta; pale yellow on distal half of pprn lb and posteroventral two-thirds of anepst and prepm; buff on pal cal; dark buff on dorsal lobe of sbsctl; black on proximal half of pprn lb, anteroventral half and posterodorsal margin of anepst, anepm, dorsal surfaces of mid and hind coxae, remainder of pleurites and ventral lobe of sbsctl. Scutellar depression (Fig. 22) large 0,71 × 0,52 mm (0,66–0,72 × 0,52–0,58 mm) and moderately deep, covering almost entire dorsal surface of scutellum, setae silver, arising from distinct alveoli. Setae on remainder of thorax moderately long, pale golden. Three (or 4) black sctl macrosetae (Fig. 22).

Legs: Mostly orange brown, pale buff on proximal tip of fore femur (reaching one-third femur length in second paratype), proximal halves of mid and hind femora and distal tips of fore and mid femora and mid tarsus pale buff. Tarsomeres terminating in row of long, thickened av and pv setae, except on hind leg where pv seta is replaced by comb of setae.

Wing: Base of costa with 2 black macrosetae. Dorsal surface of Rs proximal to R_1 branch with 16 (12–16) long setae on right wing and 15 (12–17) on left wing. Pterostigma yellow brown, dark brown basally. Following cells lack microtrichia: almost entire sc, base of br, and cup. Wing pale yellow brown, infuscation (Fig. 30) pale smoky grey. Haltere ochre with orange brown base and stem (pale in second paratype).

Abdomen (Fig. 34): Tergites dark brown, with ochre-coloured first segment and proximal margin of T2 and pale brown semicircular marks on proximal margin of T2 and T3, orange brown tinge on T4. Setae short, pale.



Figs 14–37. *robusticornis* species group. 14, 18, 22, 26, 30 & 34. *G. amplicavum*. 14. Head, lateral view. 18. Head, dorsal view. 22. Scutellum dorsal view (sb = scutellar base). 26. Hind tibia, ventral view. 30. Wing, apical half. 34. Abdominal pattern, dorsal view. 15, 19, 23, 27 & 31. *G. clarala*. 15. Head, lateral view. 19. Head, dorsal view. 23. Scutellum, dorsal view. 27. Hind tibia, ventral view. 31. Wing, apical half. 16. 20, 24, 28, 32, 35 & 37. *G. pallidinotata*. 16. Head, lateral view. 20. Head, dorsal view. 24. Scutellum, dorsal view. 28. Hind tibia, ventral view. 32. Wing, apical half. 35. Abdominal pattern, dorsal view. 37. Male genitalia, lateral view. 17, 21, 25, 29, 33 & 36. *G. robusticornis*. 17. Head, lateral view. 21. Head, dorsal view. 25. Scutellum, dorsal view. 29. Hind tibia, ventral view. 33. Wing, apical half. 36. Abdominal pattern, dorsal view. (Scale bars = 1 mm).

Holotype: MADAGASCAR: ♀, 'MADAGASCAR: Prov. / Fianarantsoa, 7 km / W Ranomafana [21°15'S:47°25'E], 900m / 17–22 February 1990 / W. E. Steiner'; 'Malaise trap in / small clearing, / montane / rain forest'; 'HOLOTYPE [printed in red] ♀ / Graptomyza amplicavum / A.E. Whittington' [red framed rectangular label, my hand writing] (USNM). Holotype in good condition.

Paratypes: MADAGASCAR: 2 ♀, Province Fianarantsoa, 7 km W. Ranomafana [21°15'S:47°25'E], 17–22.ii.1990, 8–13.iii. 1990, W. E. Steiner, 900m, Malaise trap in small clearing, montane rain forest (USNM & NMSA Type 511).

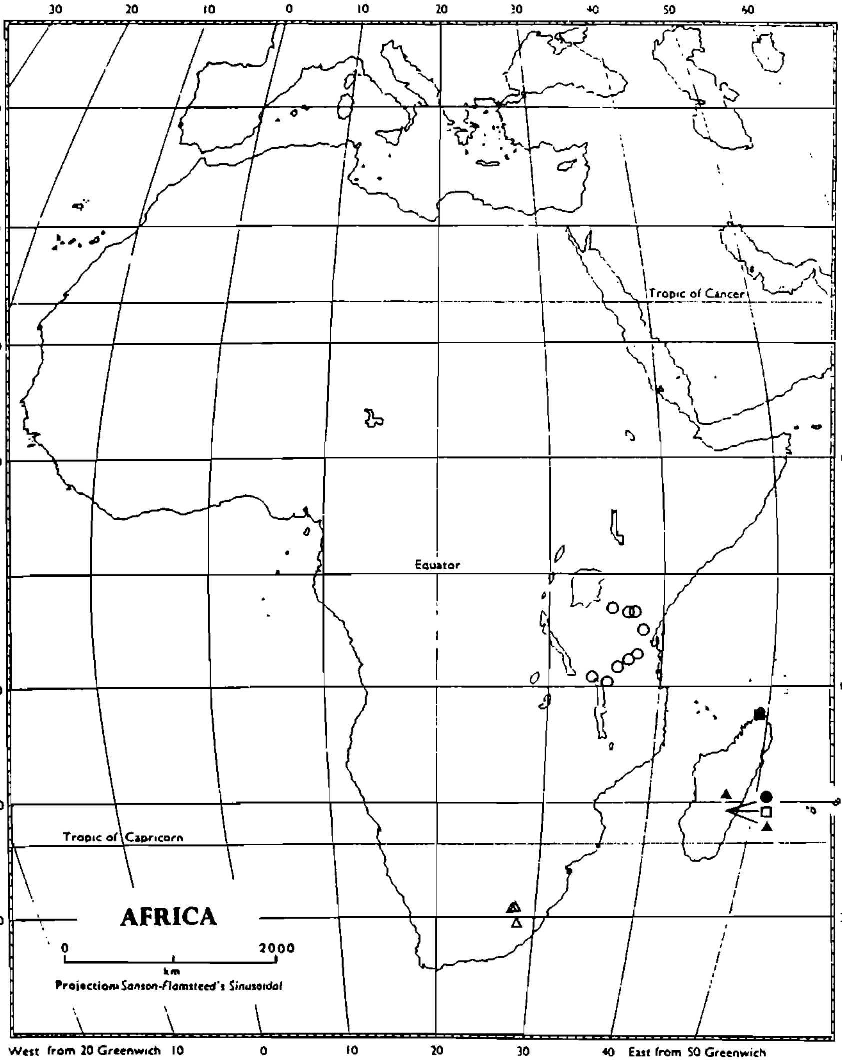

AFRICA
Tropic of Cancer
Equator
Tropic of Capricorn
0 2000 km
Projection Sanson-Flamsteed's Sinusoidal
West from 20 Greenwich 10 0 10 20 30 40 East from 50 Greenwich

Fig. 38. Distributions of *robusticornis* and *perforata* species groups. ● = *G. amplicavum*, □ = *G. clarala*, ■ = *G. pallidinotata*, ▲ = *G. (robusticornis*, ○ = *G. perforata*, △ = *G. summa*.

Graptomyza clarala sp. n.

Figs 15, 19, 23, 27, 31 & 38

Etymology: L. *clarus* = clear, L. *ala* = wing, referring to the lack of infuscation on the wing.

Body length: 7,87 mm; wing length: 7,67 (7,47–7,67) mm.

Head (Figs 15 & 19): Black with very pale yellow band from around base and sides of antennal tubercle, down length of face (each side of black medial area) to tip of epistome, another narrower band from postgena to tip of epistome on its margin. Lower half of occiput densely covered with silver pruinosity, upper half with sparse, thin silver setae. Epistome projecting beyond tip of A.s.3 by two-thirds length of A.s.3. Eye red brown with moderately long pile. FH ratio 0,27:1 (0,26:1 in paratype). A.s.1 and A.s.2 black, pruinosity silver. Arista pale brown, vestiture longer than width of arista at base. A.s.3 tinged with pale ochre ventrally, blunt apically, 3,1 times longer than wide. Outer sacculus oval, 0,06 × 0,03 mm, pale ochre, midway down width and one-quarter the length of A.s.3 from base. Inner sacculus round, ca. 0,03 mm in diameter, pale ochre, about midway from upper margin of A.s.3 and directly below base of arista. Setae: black, base of occiput with long pale setae, becoming shorter dorsally.

Thorax: Black, with pale yellow as follows: outer half of pprn lb, prepst (pale brown in paratype), prepm, dorsal portion of anepst, pal cal and semicircular area on hind margin of scutum. Scutellar depression very broad (Fig. 23), 0,96 × 0,61 (1,03 × 0,58) mm, black, pitted. Setae long, pale golden, intermingled with black setae. Four black sctl macrosetae (Fig. 23).

Legs: Fore coxa dark brown, other coxae black, hind coxa with dull buff coloured intersegmental membrane; femora and tibiae red brown; fore and mid tarsi ochre (orange brown in paratype), hind tarsi orange brown, all with black intersegmental membrane. Dense, thick, setae on ventral surface of mid tarsus reddish (in addition to those of hind tibia and all tarsi). Empodium strongly plumose.

Wing: Base of costa without distinct black macrosetae. Dorsal surface of Rs proximal to R_1 branch with 20 (17) long setae on left wing, 19 (17) on right wing. Pterostigma pale yellow. Following cells lack microtrichia: base of br, bm, cup and a. Wing smoky, with yellowish tinge, venation slightly orange, no infuscation (Fig. 31). Calypters white at base, otherwise smoky with black marginal band; marginal setae black, short on upper calypter. Haltere pale yellow, ochre at base of stem.

Abdomen: Tergites very dark red brown, with ochre anterior margin on T1, T2 and T3 with blue iridescence (extending to T4 in paratype). Setae pale.

Holotype: MADAGASCAR: ♀, 'MADAGASCAR: Prov. / Fianarantsoa, 7 km / W Ranomafana [21°15'S:47°25'E], 900m / 23–28 February 1990 / W. E. Steiner'; 'Malaise trap in / small clearing, / montane / rain forest'; 'HOLOTYPE [printed in red] ♀ / Graptomyza clarala / A.E. Whittington' [red framed rectangular label, my hand writing] (USNM). Holotype in good condition.

Paratype: MADAGASCAR: 1 ♀, Province Fianarantsoa, 7 km W. Ranomafana [21°15'S:47°25'E], 23–28.ii.1990, W. E. Steiner, Malaise trap in small clearing, montane rain forest, 900 m (USNM & NMSA Type 513).

Graptomyza pallidinotata sp. n.

Figs 16, 20, 24, 28, 32, 35, 37 & 38

Etymology: L. *pallidus* = white, L. *notata* = marked, referring to the white markings on the abdomen and thorax.

Body length: 3,32 (3,32–5,13) mm; wing length: 3,31 (3,31–4,67) mm.

Head (Figs 16 & 20): Ochre on face and gena, black frons and broad band through gena (across facial tubercle to clypeus); frons with 2 small ochre coloured lateral lobes and 2 ochre protrusions each side of antennal tubercle. Frons and vertex pitted. Epistome blunt, not projecting beyond facial tubercle. Eye red brown with short pile. FH ratio 0,31:1 (0,33:1). A.s.1 ochre, A.s.2 dull grey. Arista ochre darkening to brown midway along its length. A.s.3 grey dorsally, ochre ventrally; 2,60 (2,19–2,60) times longer than wide. Outer sacculus, ochre, circular 0,02 (0,02–0,03) mm in diameter, situated on margin of grey and ochre colouring and surrounded on 3 sides by grey, one-quarter (to one-third) length of A.s.3 from base. Inner sacculus set closer to base and more ventral on segment. Setae: black on antennal and facial tubercles (dense on latter in larger paratype).

Thorax: Dorsal pattern of scutum brown with irregular black bands and blotches, lateral edges pale ochre; creamy white on pprn lb, npl and dorsal lobe of anepst (npl consistently brown with scutum in larger paratype); pale ochre on prepst and prepm; dark brown to black on other pleurites; scutellum dark brown dorsally, ochre laterally; sbsctl black. Almost entire dorsal surface of scutellum depressed, setose depression (Fig. 24) shallow, 0,29 × 0,22 (0,29–0,48 × 0,21–0,29) mm, brown, setae pale (raised posteriorly in 2 tufts in small paratype). Setae short, pale golden. Three black sctl macrosetae (Fig. 24).

Legs: Fore and mid legs and coxae to basal half of femora of hind leg pale ochre, distal half of fore and mid femora slightly darker and remainder of hind leg dark ochre; dorsal surface of hind coxa dark brown. Tarsomeres terminate in row of thickened av and pv setae, except on hind leg where pv seta is replaced by comb of setae. Empodium finely plumose.

Wing: Base of costa with 3 black macrosetae. Dorsal surface of Rs proximal to R_1 branch with 13 (11–16) long setae on right wing, 14 (12–14) on left. Pterostigma brown, proximally dense and dark. Following cells lack microtrichia: asc and base of sc. Membrane hyaline, infuscation smoky (Fig. 32). Stem of haltere pale yellow, knob creamy white.

Abdomen (Fig. 35): T1 pale ochre, remaining tergites transparent (creamy white to ochre) with following markings: T2 with dark brown median triangle and 2 lateral L-shaped markings not joined to median triangular marking (joined in paratypes as illustrated in Fig. 35), T3 and T4 with lateral L-shaped markings joined to median rectangular shaped marking. Setae short, pale brown. Genitalia

(Fig. 37) small: Cercus rounded. Surstylus broad, extended dorsally at apex, setae not observed. Hypandrium extended basally, aedeagal guide stout. Paramere basally broad and short, arms low over distiphallus, stout. Basiphallus tubular with flattened tip. Distiphallus a conical hood. Genital shield weakly developed.

Holotype: MADAGASCAR: ♂, 'MADAGASCAR: / near Ambilobe, / Ankarana. [13°10'S:49°03'E] ix.1986. / S. V. Fowler. / NMW.Z.1986-131.'; 'Graptomyza [hand written] / sp. [hand written] / det. J. C. Deeming'; 'HOLOTYPE [printed in red] ♂ / Graptomyza pallidinotata / A.E. Whittington' [red framed rectangular label, my hand writing] (NMWC). In good condition, but hind left leg missing (genitalia dissected and mounted with specimen).

Paratypes: MADAGASCAR: 2 ♀, near Ambilobe, Ankarana [13°10'S: 49°03'E], ix.1986, S. V. Fowler (NMWC & NMSA Type 512).

Graptomyza robusticornis van Doesburg, 1957

Figs 17, 21, 25, 29, 33, 36 & 38

Graptomyza robusticornis van Doesburg, 1957: 107; Keiser, 1971: 259; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *robustus* = strong or robust, L. *cornis* = horn. Refers to the robust antenna.

Redescription: Based on female paratype from the Manjakatompo Forest Station. Male apparently unknown.

Body length: 5,58 (5,13–5,73) mm; wing length: 5,70 (5,00–5,70) mm.

Head (Figs 17 & 21): Yellow with black markings on frons and bands on facial tubercle margin and across gena to shortly before epistomal margin (extending along epistomal margin). Facial tubercle smoothly gibbose. Epistome blunt, not projecting beyond facial tubercle. Eye brown with moderately long pile. FH ratio 0,34:1 (0,35:1). A.s.1 and A.s.2 dull dark grey. Arista ochre darkening to brown midway along its length (entirely ochre or entirely dark). A.s.3. blunt apically; 2,40 (2,10–2,40) times longer than wide. Outer sacculus buff, oval, large, 0,10 × 0,06 (0,09–0,13 × 0,06–0,07) mm, deep, situated in second quarter from base and midway on width of A.s.3. Inner sacculus slit-like (0,03 × 0,02 mm) basally positioned at lower edge of A.s.3. Setae: black on facial and antennal tubercles.

Thorax: Orange brown (scutum mottled); pale yellow (creamy white) on pprn lb (sometimes with proximal black margins) and dorsal half of anepst; buff on pal cal; dark brown (sometimes black) on anterodorsal margin of anepst, mtepst, mtepm and dorsal surface of hind coxa and anepm; black on dorsal half of mr and ktg; sbsctl glossy, slightly paler than notum with upper lobe convex. Scutellar depression large (Fig. 25), 0,50 × 0,35 (0,47–0,50 × 0,33–0,35) mm and moderately deep, pale bronze setae arising from distinct alveoli. Setae on remainder of thorax moderately long, pale golden. Three black sctl macrosetae (Fig. 25). Subscutellum with fine silver pruinescence.

Legs: Pale buff, distal halves of all femora and remainder of hind legs orange brown. Tarsomeres 3–4 with black terminal setae on dorsal surface and all tarsomeres terminating in thickened av and pv setae, except on hind leg where pv seta is replaced by comb of setae.

Wing: Base of costa with 3 (4) black macrosetae. Dorsal surface of Rs proximal to R_1 branch with 16 (13–16) long setae on right wing and 14 (11–14) on left wing. Pterostigma pale brown. Following cells lack microtrichia: most of sc, base of c, br and cup. Membrane hyaline, infuscation (Fig. 33) smoky grey, pale. Haltere pale orange brown (stem white to red brown).

Abdomen (Fig. 36): Tergites mottled brown, with opaque cream coloured basal segment and 2 pale semi-circles on second segment, orange brown tinge at apex of fourth segment. Setae short, pale, longest on anterolateral margin of T2.

Paratype: MADAGASCAR: 1 ♀, Manjakatompo forest station, Ankaratra massif [19°20'S:47°26'E], i.1956, B. Stuckenberg (NMSA, Type number 26).

Additional material examined: MADAGASCAR: 1 ♀, Manjakatompo, district Ambatolampy [19°20'S:47°26'E], 11–15.xii.1957, B. Stuckenberg, 1700m (NMSA); 2 ♀, Province Fianarantsoa, 7 km W. Ranomafana [21°15'S:47°25'E], 8–21.x.1988, 1–7.iii.1990, W. E. Steiner, 900m and 1100m, black light in montane rain forest near river and stream, and Malaise trap with flight intercept yellow pan trap in small clearing and on island, montane rain forest (USNM).

Discussion: The depository of the holotype could not be traced. Dr P. H. van Doesburg (*pers. comm.* 30 May 1990) stated that it was in the IRS – Tananarive. It was apparent from correspondance with Madagascan institutions that specimens of this genus were not likely to be found in their institutions. Similarly correspondance with Dr L. Matile (*pers. comm.* 25 March 1991) indicates the absence of this specimen from the Paris Museum. Additional specimens examined by Keiser (1971) were also not located.

In the 1988 Fianarantsoa specimen the setae in the depression are erect, not recumbent, meeting at a point above the centre rather than near the margin. As Keiser (1971) stated, the abdominal markings are 'not stable'. Some specimens have two basal semicircles on T2, T3 and T4, while others have these markings only on T2 and T3.

perforata species group

Diagnosis: Facial tubercle with pronounced callosity and elongate epistome (Figs 39 & 40). Frons flat. Width of A.s.3 more than half the length, apex not tapering, giving rectangular appearance.

Additional characters (shared by all members of this species group, but also present in other species groups):

A.s.3 orange brown, darkened distally and having silver pruinosity. Eye red brown with long pile. Rows of reversed dc setae reaching across scutum. Microtrichia absent from base of br and cup. Genital shield poorly developed.

Included species: *G. perforata* van Doesburg, 1960 and *G. summa* sp. n.

Distribution: This species group is distributed disjunctly in the Tanzanian and Lesotho highlands (Fig. 38). *G. perforata* has been collected predominantly from forest, while *G. summa* is clearly a montane grassland species.

Graptomyza perforata van Doesburg, 1960

Figs 38, 39, 41, 43, 45, 47 & 48

Graptomyza perforata van Doesburg, 1960: 435; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *perforare* = to pierce, referring to the deep depression on the scutellum.

Redescription: Based on male holotype.

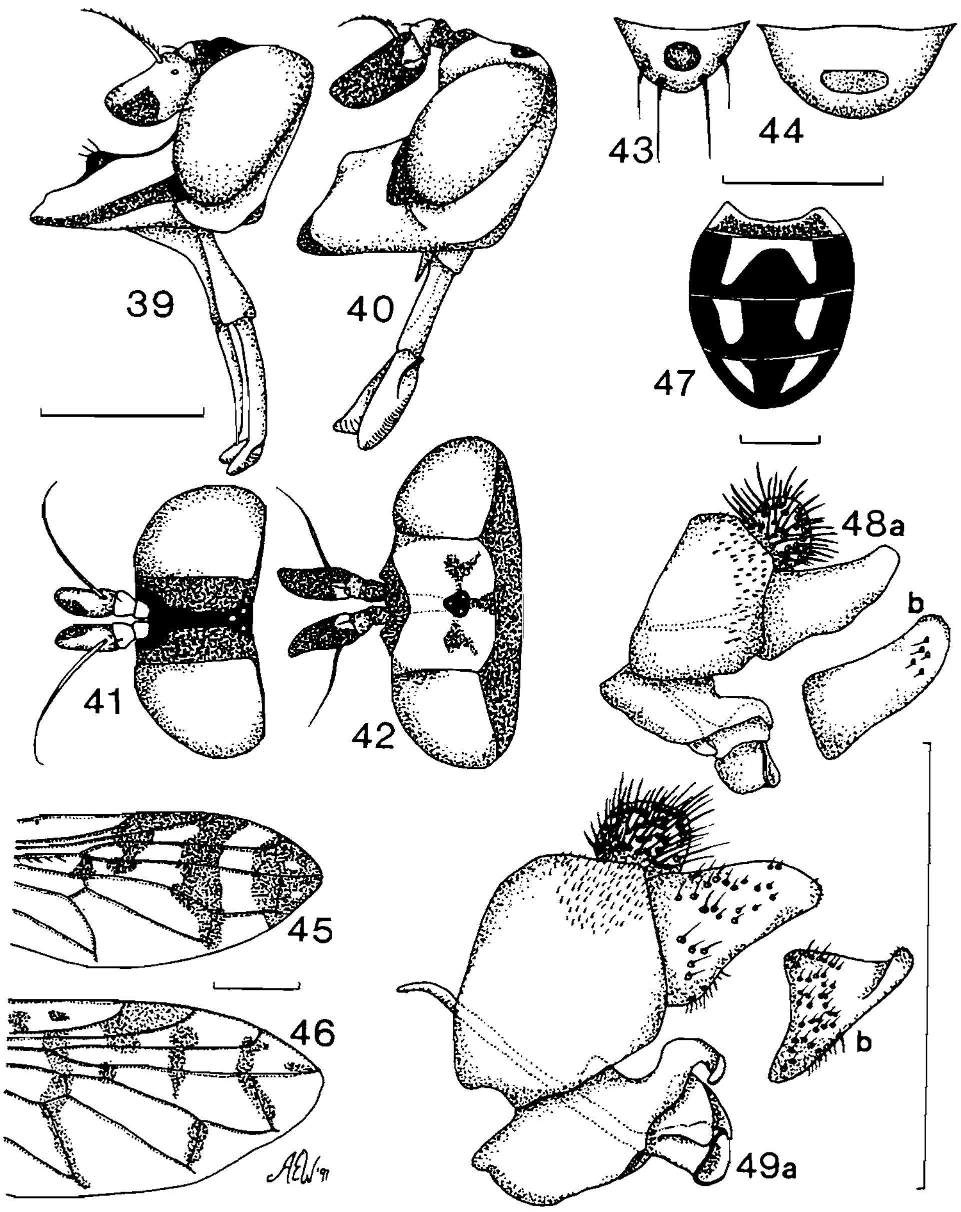
Body length: 4,80 (4,80–5,67) mm; wing length: 5,13 (4,87–6,07) mm.

Head (Figs 39 & 41): Pale buff (dull on gena), darkened to ochre on frons (orange brown in some females). Pale brown (dark in other specimens) bands across tubercle from epistome almost to base of antennae, across gena from base of eye to epistome and across frons from around base of antennae to ocellar triangle. Epistome long, projecting almost twice as far as A.s.3. Eye with silver pile. FH ratio 0,34:1 (0,28–0,34:1). Arista dark brown, vestiture shorter than width of arista at base. A.s.3 darkened to grey distally, 1,55 (1,50–2,00) times longer than wide. Outer sacculus circular, small (0,02 mm) with raised proximal margin, situated one-fifth length of A.s.3 from base and slightly above midway through A.s.3 width (between one-third and half the length and just below midway on width of A.s.3 in females). Inner sacculus slit-like, basally positioned near lower edge of A.s.3. Three (4) strong black setae in a row each side of facial tubercle, shorter black setae between these and epistome. Frons and vertex with pale erect setae, recumbent towards antennae.

Thorax: Pale buff, darkening to ochre on lateral parts of scutum and scutellum; dark buff and bare on dorsal surface of hind coxa; dark brown on anepst, kepst, anepm, dorsal parts of scutum (dorsum of scutum sometimes faintly iridescent blue) and sbsctl; scutellum darkest laterally, but pale buff between sctl macrosetae. Scutellar depression deep, oval (Fig. 43) 0,19 × 0,11 (0,08–0,19 × 0,05–0,13) mm, with dark brown margins rolled in, filled with posteriorly directed, fine golden setae curving up posterior wall of depression. Setae on remainder of thorax white (dark brown over supra-alar region and on posterior margin of scutellum). Well developed black macrosetae as follows: 1 npl, 1 anepst, 2 sctl (anterior pair frequently indistinct from setae), and a few shorter black setae on scutellum between macrosetae.

Legs: Pale cream (brown in less teneral specimens), each segment slightly darkened apically, tarsomeres 2–5 and distal half of hind femur dark buff. Setae pale, longer ventrally and distally, intermingled with shorter dark setae distally on each segment. Mid femur with ventral row and hind femur with anterior row of long conspicuous setae. Tibiae terminating ventrally in 3 (4) stout spines. Tarsomeres bearing thickened short black setae in rows ventrally.

Wing: Base of costa small, with short black setae intermingled with 4 slightly



Figs 39–49. *perforata* species group. 39, 41, 43, 45, 47 & 48. *G. perforata*. 39. Head, lateral view. 41. Head, dorsal view. 43. Scutellum, dorsal view. 45. Wing pattern. 47. Abdominal pattern, dorsal view. 48. Male genitalia. a. Lateral view. b. Surstylus, inner view. 40, 42, 44, 46 & 49. *G. summa*. 40. Head, lateral view. 42. Head, dorsal view. 44 Scutellum, dorsal view. 46. Wing pattern. 49. Male genitalia. a. Lateral view. b. Surstylus, inner view. (Scale bars = 1 mm).

longer black setae; base also with 6 setae longer than other costal setae. Dorsal surface of Rs proximal to R_1 branch with 9 (8–16) long setae on right wing and 8 (8–14) on left wing. Following cells lack microtrichia: entire asc and most of sc, base of c, r_1. Membrane infuscation pale brown (Fig. 45). Stem of haltere pale buff, knob white and finely pruinose.

Abdomen (Fig. 47): Pale buff, most setae short and white, alveoli black, raised. Dark markings (variable): T1 with 2 small patches posterior to anterior bulge; on T2 along lateral margins, curving along posterior margin and joining (not joined in some specimens) to form median band not reaching anterior margin; on T3 much narrower (not always) along lateral margins, broader (not in all specimens) along posterior margin and broad median band reaching anterior margin; T4 lateral band poorly developed (same as for T3 in some specimens), with posterior and median bands bold. Genitalia (Fig. 48): Cercus rounded. Surstylus elongate, indented ventrally near base, with few setae on internal surface at tip (Fig. 48b). Hypandrium basally extended with short stout aedeagal guide. Paramere broad throughout, arms low over distiphallus. Basiphallus distended with wide indented cone at tip. Distiphallus a low conical hood. Genital shield not developed.

Holotype: TANZANIA: ♂, 'Holotypus' [apricot label with black frame]; 'Holotype'[yellow label with black frame]; 'COLL. MUS. CONGO / Tanganyika Terr.:Ngoron- / goro, Rest Camp [03°00'S:35°25'E], 2400– / 2500 m. 6/19-vi-1957'; 'Mission Zoolog. I.R.S.A.C. / en Afrique orientale / (P. Basilewsky et / N. Leleup)'; 'Graptomyza / perforata n.sp. / det. P.H. van Doesburg / 1959' [hand written] (MRAC). In good condition, but lacking left arista and one sctl macroseta; judging by the paleness of markings, the specimen is teneral.

Additional material examined: TANZANIA: 1 ♀, Mt Meru [03°14'S:36°45'E], 21.vi.1962, 1800 m (CNCI); 1 ♀, W. Usambara Mts., Magamba [04°42'S: 38°18'E], iii.1962, 2100 m (CNCI); 1 ♀ 1 ♂, Ulguru Mts. [Uluguru Mts.? 07°10'S:37°40'E], 1500–1800 m (CNCI); 1 ♀, Uzungwa Mts., Mwanihana Forest above Sanje [07°50'S:36°50'E], 1.viii.1982, M. Stoltze & N. Scharff, 1000 m (CNCI); 1 ♀, Uzungwa Mts., Chita Forest Reserve [08°20'S:35°58'E], 10.xi.1984, M. Stoltze & G. Petersen, 1500 m (CNCI); 1 ♀, Mdando Forest, 30 mls S. of Njombe [09°47'S:34°47'E], 8.x.1962, 2400 m (CNCI); 1 ♀, SW. Mt. Rungwe [09°10'S:33°40'E], 20.viii.1980, M. Stoltze & N. Scharff, 1900 m (CNCI); 1 ♀, Rungwe Mts. [09°10'S:33°40'E], xi.62, 2600 m (CNCI).

Discussion: The allotype female has not been examined. It is in the private collection of van Doesburg (van Doesburg 1960) and bears the following data: TANZANIA: 1 ♀, Kilimanjaro, Marangu [03°17'S:37°31'E], 13–20.vii.1957, [prob. P. Basilewsky et N. Leleup], 1600–1750 m.

Graptomyza summa sp. n.

Figs 38, 40, 42, 44, 46 & 49

Etymology: L. *summus* = highest; the summit of, referring to the high altitude of the localities at which this species has been found.

Body length: 6,48 (6,48–7,20) mm; wing length: 5,53 (5,53–6,40) mm.

Head (Figs 40 & 42): Orange brown. Facial concavity pronounced, dull brown, finely pruinose. Frons and vertex pitted. Ocellar triangle black. Occiput pale buff, darkening to dark grey in upper half, pitted. Antennal tubercle bordered with brown. Epistome projecting no further than tip of A.s.2, black bordered. Eye with pale golden setae. FH ratio 0,45:1 (0,44–0,49:1). Occiput deep. A.s.1 and A.s.2 orange brown. Arista brown, vestiture much shorter than half width of arista at base. A.s.3 darkening to brown distally; 2,3 times longer than wide. Outer sacculus oval (0,02 × 0,01 mm), enclosed in deep, elongate fold one-fifth width of A.s.3 from bottom of segment, directly below base of arista (one-quarter length of A.s.3 from base). Inner sacculus round (0,01 mm), one-third width of A.s.3 from upper margin and directly below base of arista. Setae: black on antennal tubercle, arising from distinct pits on vertex and occiput.

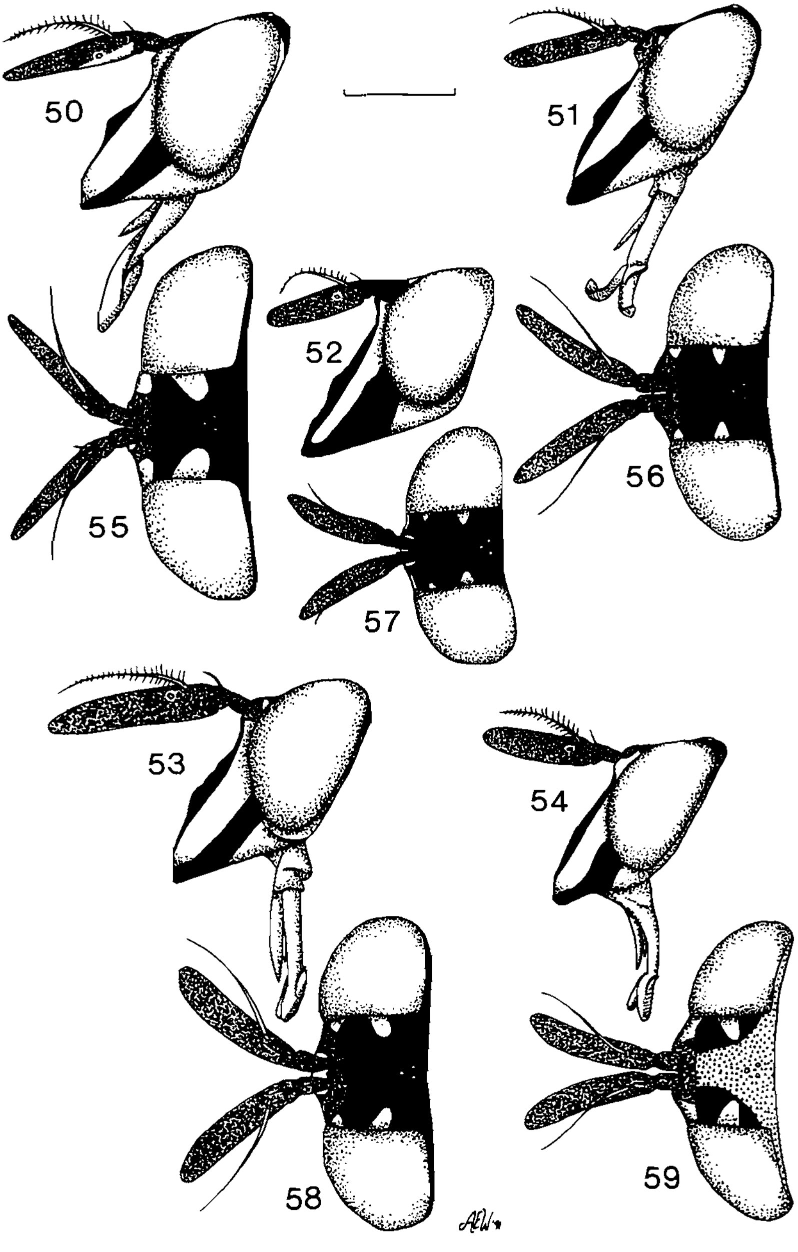
Thorax: Black, with lateral edges of scutum and whole scutellum ochre; dull, pale buff on prepm and dorsal lobe of kepst. Scutellar depression (Fig. 44) 0,43 × 0,18 (0,40–0,43 × 0,15–0,18) mm, shallow, brown, pitted, with erect black setae extending beyond hind margin. Setae on remainder of thorax long, pale golden, but setae of prepst, prepm, anepm, kepm, ktg, anatg, sbsctl, upper lobes of mr and dorsal surface of hind coxa very short. Setae absent from anterior margin of mesonotum, lower lobes of anepst, kepst and mr, lower hind surface of fore coxa and upper anterior surface of hind coxa and scutellum anterior to scutellar depression; these areas highly glossy. Well developed pale golden macrosetae barely distinguishable from vestiture, as follows: 3 npl, 4 spal, none on sctl (Fig. 44), all others obscured by setae of same length and texture.

Legs: Coxae to basal four-fifths of femora black to dark brown, remainder ochre darkening to brown on last 2 tarsomeres; hind legs slightly darker than fore and mid legs, dorsal surface of hind coxa black. Setae pale golden, conspicuously longer on posterior margins, intermingled with black setae dorsally on all tarsi and on hind tibia (no black setae in 'Blue Mountain Pass' paratype). Apical fifth of hind femora with ventral setae dense and thickened.

Wing: Base of costa with 4 well developed pale golden setae. Dorsal surface of Rs proximal to R_1 branch without long setae. Pterostigma orange brown. Membrane hyaline, infuscation smoky (Fig. 46). Stem of haltere pale brown, knob yellowish (sometimes brown).

Abdomen: Black on T1 and 2 small oval marks on margin of T2, remainder of T2 and other tergites orange brown. Setae pale golden. Genitalia (Fig. 49): Cercus quadrate. Surstylus narrowed distally, exterior surface with scattered setae, interior surface with setae concentrated basally and very fine setae apically (Fig. 49b). Hypandrium ventrally swollen, no apparent aedeagal guide. Paramere broad at base, arms high over distiphallus and twisted outwards. Basiphallus tubular, with wide conical indentation at tip. Distiphallus a conical hood. Genital shield narrow, without spines.

Holotype: SOUTH AFRICA: ♂, 'South Africa : Cape / Naudesnek Summit ca. / 15km E Rhodes 3028CC [30°44'S:28°08'E]/ J.Londt+B.Stuckenberg / 8–9.i.1979 Grassland / + stream edges'; 'HOLOTYPE [printed in red] ♂ / Graptomyza



Figs 50–59. *aurea* species group. 50 & 55. *G. aurea*. 50. Head, lateral view. 55. Head, dorsal view. 51 & 56. *G. breviscutum*. 51. Head, lateral view. 56. Head, dorsal view. 52 & 57. *G. lutea* 52. Head, lateral view. 57. Head, dorsal view. 53 & 58. *G. nigra*. 53. Head, lateral view. 58. Head, dorsal view. 54 & 59. Undescribed sp. 1. 54. Head, lateral view. 59. Head, dorsal view. (Scale bar = 1 mm).

summa / A.E. Whittington' [red framed rectangular label, my hand writing] (NMSA Type 510). Wings slightly greasy.

Paratypes: LESOTHO: 1 ♀, Little Bokong River [29°25'S:28°08'E], 4.i.1947, L. Bevis (NMSA); 1 ♀, Blue Mountain Pass, Makhaleng Valley, Maloti Mountains, Maseru District [29°44'S:27°43'E], 2150–2525 m, 12–14.i.1963, B. & P. Stuckenberg (NMSA).

aurea species group

Diagnostic character: Mid basitarsus in male depressed and plate-like (Figs 60–64).

Additional characters (shared by all members of this species group, but also present in other species groups):

Dark brown bands across facial tubercle from epistome margin to base of antennae, at angle across gena from eye margin to tip of epistome and across frons and vertex. Frons moderately depressed where dark. Facial concavity shallow, setose except on centre of brown band. Antennal socket bordered with brown. Outer sacculus small and circular. Eye pile moderately long. Coxae and kemp dark brown. Setae of scutellar depression curve up posterior wall. Macrosetae of thorax: 2 npl, 2 anepst, 2 sctl. Two black macrosetae on base of costa. Following cells lack infuscation: ac, at least base of br, r_1 and basal quarter of cup. Stem of haltere pale buff, knob white and finely pruinose. Genital shield narrow, without spines.

Included species: *G. aurea* Bezzi, 1915, *G. breviscutum* Curran, 1929, *G. lutea* sp. n., *G. nigra* Bezzi, 1915, Undescribed sp. 1.

Distribution: mainly high rainfall areas of western and central Africa (Fig. 80).

Graptomyza aurea Bezzi, 1915

Figs 50, 55, 60, 65, 69, 72, 76a & 80

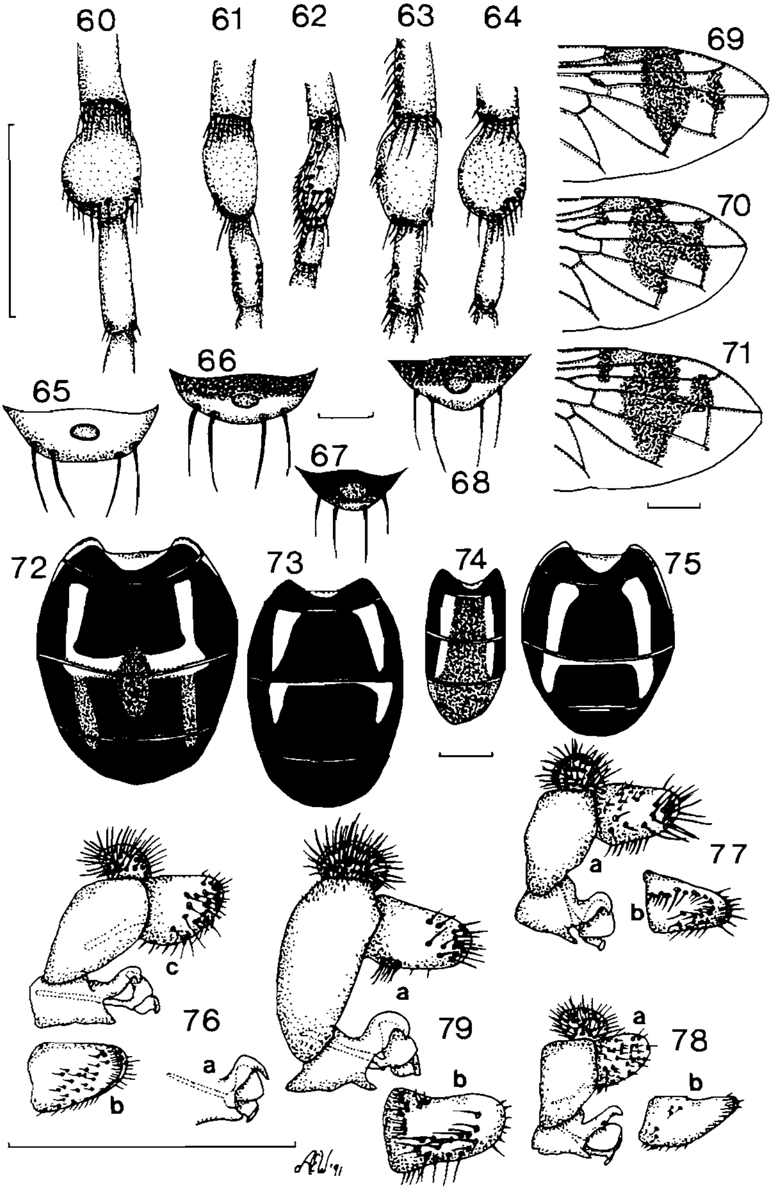
Graptomyza aurea Bezzi, 1915: 59; Curran, 1927: 49; Curran, 1938: 14; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *aureus* = golden, referring to the setation.

Redescription: Based on male lectotype.

Body length: 9,27 (7,80–9,27) mm; wing length: 7,00 (6,93–7,33) mm.

Head (Figs 50 & 55): Dark yellow with narrow dark brown bands. Facial tubercle gibbose, with single bump sharply angled distally. Epistome projecting beyond facial tubercle, but no further than A.s.2. Eye black (sometimes pale golden) with pale golden pile. FH ratio 0,32:1 (0,32–0,34:1). Antenna yellowish brown, dark brown dorsally. A.s.1 with apical crown dark brown on A.s.1, pale on A.s.2, single black macroseta dorsally on A.s.2 (sometimes pale golden). Aristal vestiture on dorsal and ventral surfaces, longer than width of arista at base. A.s.3 long and slender, 4,90 (4,53 to 5,03) times longer than wide, with fine pale brown pruinosity. Outer sacculus diameter 0,04 (0,03–0,08) mm, pale yellow with brown margin, raised proximally, situated one-quarter the length from base and midway on width of A.s.3. Inner sacculus smaller, diameter 0,02 mm (variable from



Figs 60–79. *aurea* species group. 60, 65, 69, 72 & 76a. *G. aurea*. 60. Basitarsus, ventral view. 65. Scutellum, dorsal view. 69. Wing, apical half. 72. Abdominal pattern, dorsal view. 76a. Male genitalia, lateral view. 61, 66, 70, 73 & 77. *G. breviscutum*. 61. Basitarsus, ventral view. 66. Scutellum, dorsal view. 70. Wing, apical half. 73. Abdominal pattern, dorsal view. 77. Male genitalia. a. Lateral view. Surstylus, inner view. 62, 67, 74 & 78. *G. lutea*. 62. Basitarsus, ventral view. 67. Scutellum, dorsal view. 74. Abdominal pattern, dorsal view. 78. Male genitalia. a. Lateral view. b. Surstylus, inner view. 63, 68, 71, 75 & 79. *G. nigra*. 63. Basitarsus, ventral view. 68. Scutellum, dorsal view. 71. Wing, apical half. 75. Abdominal pattern, dorsal view. 79. Male genitalia. a. Lateral view. b. Surstylus, inner view. 64 & 76b,c. Undescribed sp. 1. 64. Basitarsus, ventral view. 76b,c. Male genitalia. b. Surstylus, inner view. c. Lateral view. (Scale bars = 1 mm).

circular depression 0,02 mm in diameter to slit 0,03 × 0,02 mm), situated directly below base of arista and midway on width of A.s.3. Setae fairly long and golden on epistome, gena, frons and vertex. Long black setae on brown band between tubercle and epistome.

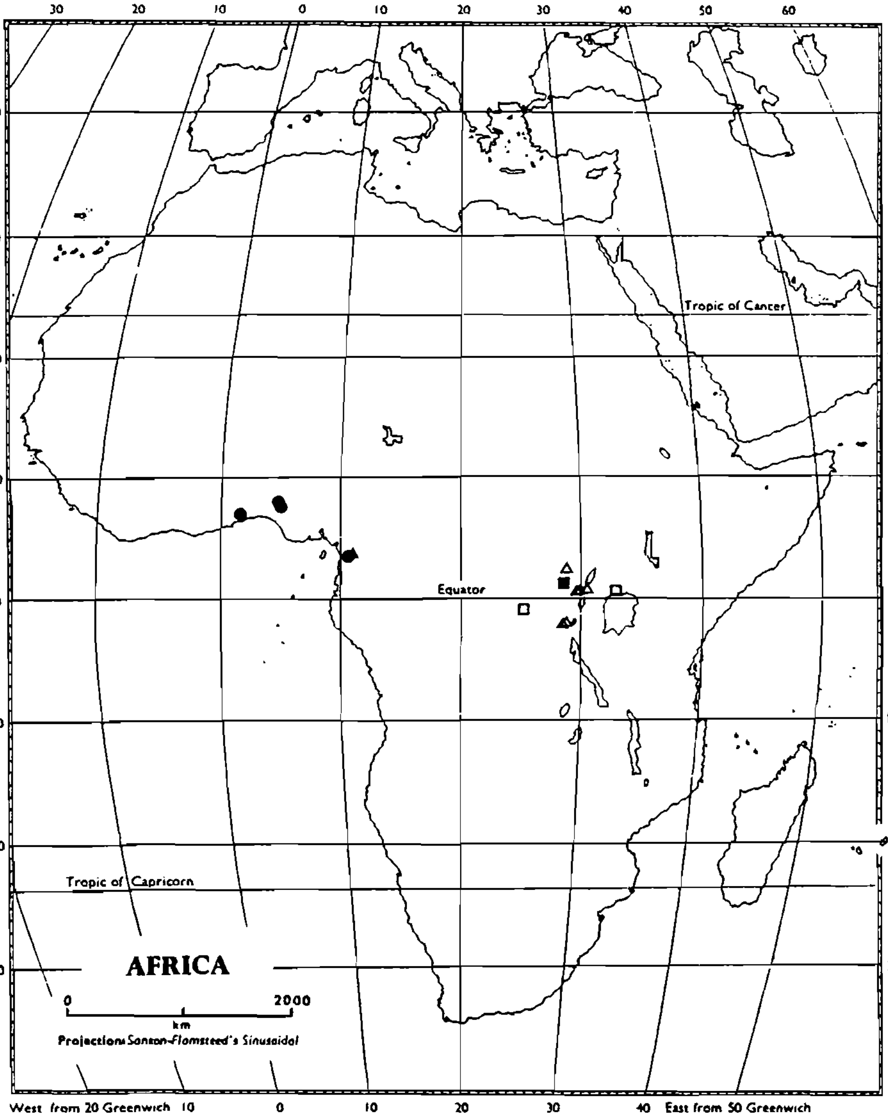
Thorax: Golden yellow, prepm palest, hind margin of scutum and scutellum darker; black on dorsal surface of scutum, anterior half of anepst, kepst, anepm, mr and sbsctl; dark brown on ktg, anatg, and ventral half of convex dorsal lobe and ventral lobe of sbsctl. Scutellar depression small (Fig. 65) 0,37 × 0,24 (0,31–0,37 × 0,18–0,24) mm, very deep, with brown margin and filled with silver setae. Setae short, erect, golden, interspersed with longer setae towards posterior margin of scutum and on scutellum, long on pprn lb, pale part of anepst and anepm. One median and 2 dc bands of setae on scutum. Well developed black macrosetae with 4 (3) pal, 1 ipal (sometimes golden). Subscutellum (except ventral half of dorsal lobe) with silver pruinosity.

Legs: Golden yellow, but dark brown as follows: fore femur (except golden apex) ventrally darker, mid femur except apex, middle three-fifths of hind femur and apical four-fifths of hind tibia. Mid basitarsus of male broadly expanded (Fig. 60) to more than width of tibia apex. Setae long, golden. Empodium short, very finely plumose.

Wing: Costal setae tapering to very short at pt. Dorsal surface of Rs proximal to R_1 branch with 16 long setae on both wings (16–22 on right wing, 15–19 on left wing). Wing smoky brown, pt brown, infuscation slightly darker (Fig. 69) (♀ from Ilesha has fuller infuscation, covering entire distal half of dm and having the 2 bands densely linked along R_{4+5}). Calypters hyaline, marginal setae short, white.

Abdomen (Fig. 72): Largely dark brown with golden ochre markings: on T1 a v-shaped patch below scutellum and anterior and lateral margins; on T2 a half 'H' marking separating lateral lobes and central square of dark brown, lateral margins ochre (in some specimens lateral arms of half-H on T2 extend across T3 isolating 2 small brown squares); T3 fore margin with narrow band, a vague median triangle (rectangular in female) joins this to posterior margin, and narrow lateral margin; T4 almost wholly dark brown, but vague median band visible (median line of T3 sometimes extends across T4 to genital shield and in ♀ from Ilesha only broad lateral margins of brown remain). Setae golden, moderate in length, alveoli raised, long black setae intermingled with golden setae towards tip of abdomen. Genitalia (Fig. 76a): Cercus dorsally extended into slight cone on proximal margin. Surstylus elongate, setose along dorsal and ventral margins and over terminal third of exterior surface, with small patch of setae medially on interior surface (similar to Fig. 76b). Hypandrium blunt basally, with stout aedeagal guide and pronounced dorsal lobe. Paramere arms slightly outwardly curved at tip. Basiphallus tubular with indented tip having thickened margins (Fig. 76a). Distiphallus a conical hood (Fig. 76a).

Lectotype (here designated): NIGERIA: ♂, 'Syn- / type' [circular label with pale blue margin]; 'Graptomyza / ♂ / Type / aurea / Bezzi' [circular label with pale orange margin, printed with 'Type']; 'Oshogbo, [07°46'N:04°34'E] / S.Nigeria. / Dr T. F. G. Mayer. / Nov 1910' [date hand written]; 'Pres. by / Impl. Bureau Ent. / 1915-165'; 'Graptomyza / aurea n.sp / type ♂' [hand written]; 'LECTOTYPE ♂ / Graptomyza aurea / Bezzi, 1915 / designated: A. E. Whittington' [red framed rectangular label, LECTOTYPE printed in black, remainder in my hand writing] (BMNH). Lectotype in reasonable condition, wing margins frayed, complete left hind leg and right hind tibia and tarsus missing.


30
20
10
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10
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Tropic of Cancer
Equator
Tropic of Capricorn
AFRICA
0
2000
km
Projection: Sanson-Flamsteed's Sinusoidal
West from 20 Greenwich 10
0
10
20
30
40 East from 50 Greenwich

Fig. 80. Distribution of *aurea* species group. ● = *G. aurea*, △ = *G. breviscutum*, ■ = *G. lutea*, □ = *G. nigra*, ▲ = Undescribed sp. 1.

Paralectotype: CAMEROON: 1 ♀, Ilesha [07°34′N:04°44′E], 2.viii.1910, Dr T. F. G. Mayer, caught in house (BMNH).

Additional material examined: CAMEROON: 3 ♀, Lolodorf [03°17′N:10°50′E], 10.iii.1911, 9.xii.1911, 4.ii.1915, A. I. Good (CNCI). GHANA: 1 ♀, Kwadaso [06°42′N:01°39′E], 3.x.1952, J. Bowden (NMSA). NIGERIA: 1 ♂, [incorrectly labelled as syntype] Oshogbo [07°46′N:04°34′E], xi.1910, Dr T. F. G. Mayer (BMNH); 1 ♀, [incorrectly labelled as syntype] Ilesha [07°34′N:04°44′E], 23.vii.1910, Capt. L. E. Humfrey (BMNH).

Discussion: In his original description Bezzi (1915) designated 1 ♂ and 1 ♀ from Oshogbo (misspelt by Bezzi as 'Oshagbo'), each as 'type'. Throughout his work, Bezzi designated only one of each sex as 'type' (where one of each sex was available), but did not actually designate holotypes. The syntype labels are a later addition, incorrectly placed on two of the four specimens examined by Bezzi. The latter specimens were not stated by Bezzi to be 'types'. These two specimens also bear Bezzi's 'det.' labels, further distinguishing them from the type series. I hereby designate Bezzi's 'Type' ♂ as lectotype and his 'type' ♀ as paralectotype. The locality of the paralectotype is not Oshogbo (this locality crossed though on the label), but Ilesha, according to the circular label on the pin.

Graptomyza breviscutum Curran, 1929

Figs 51, 56, 61, 66, 70, 73, 77 & 80

Graptomyza breviscutum Curran, 1929: 7; Curran, 1938: 14; van Doesburg, 1955*a*: 353; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *brevis* = short, L. *scutum* = major part of the alinotum, referring to the short scutum.

Redescription: Based on male holotype.

Body length: 6,52 (6,27–7,27) mm; wing length: 6,06 (6,06–6,87) mm.

Head (Figs 51 & 56): Pale buff with broad dark brown bands. Facial tubercle gibbose with double bump. Epistome long, projecting beyond A.s.3. Eye red brown with silver pile. FH ratio 0,33:1 (0,32–0,36:1). Antenna dark grey with black A.s.1 and A.s.2. Arista dark brown, pale at base, vestiture on dorsal surface only, similar in length to width of arista at base. A.s.3 with silver pruinosity, 4,40 (4,06–4,77) times longer than wide. Outer sacculus, ochre, diameter 0,03 mm, situated one-third the length from base and midway through A.s.3. Inner sacculus smaller, (0,02 mm in diameter), with proximal margin slightly overhanging. Setae silver, long. Black setae on tubercle band.

Thorax: Black, pale yellow on lateral and posterior margin of scutum and posterior margin of scutellum, pprn lb, prepm, posterior quarter of anepst; buff on prepst, ktg and anatg; dark brown on mtepst and mtepm. Scutellar depression oval (Fig. 66) 0,38 × 0,26 (0,34–0,44 × 0,21–2,70) mm, with fine golden setae. Setae silver. A few short black setae on scutellum between macrosetae. Subscutellum silver pruinescent except on oval centre.

Legs: Brown with pale cream tips on fore and mid femur, tibia and tarsus, and basal quarter of hind femur. Mid basitarsus in male narrowly expanded (to greater extent proximally), slightly wider than apex of tibia (Fig. 61). Hind tarsus orange brown. Setae pale, longer ventrally and distally.

Wing: Dorsal surface of Rs proximal to R_1 branch with 12 (10–17) long setae on right wing and 15 (11–17) on left wing (1 Ruwenzori ♀ has 3 similar setae on R_1 at junction of R_1 and Rs). Following cells lack microtrichia: entire asc, and most of sc, br, base of c, and anal lobe. Pterostigma brown. Wing membrane hyaline with pale brown infuscation (Fig. 70).

Abdomen (Fig. 73): Black, with dark ochre or yellow anterior and lateral margins on T1, and lateral and dorsocentral bands on T2 and T3. Setae mostly short, pale, but long and bronze coloured and intermingled with black setae at apex on T4. Genitalia (Fig. 77): Cercus quadrate. Surstylus moderately long, external and internal surfaces setose (Fig. 77b). Hypandrium blunt basally, aedeagal guide slender and dorsal lobe pronounced. Paramere arms curving outwards at apex. Basiphallus tubular with overhanging lower margin. Distiphallus a conical hood.

Holotype: ZAÏRE: ♂, 'Graptomyza / breviscutum / Curran ♂ / Holotype' [red label, hand written]; 'Lesse, Congo / 0°20'N 29°40'E / 21-VII-1914' [hand written]; 'at flowers / of Bidens / pilosa' [hand written]; 'Graptomyza [hand written] / breviscutum [hand written] / Det. Curran [hand written] / C.H. Curran' [white label with black border] (AMNH). Holotype in good condition, but lacks an arista.

Additional material examined: ZAÏRE: 1 ♀, Mwenda, Mt. Ruwenzori [00°25'N:29°46'E], 9.xii.1948, J. C. Bradley, 1455 m (CUIC); 1 ♀, Lwiro River, 47 km N. Bukavu [02°14'S:28°48'E], 30.viii.1957, E. S. Ross and R. E. Leech, 1950 m (CASC); 1 ♀, 'TANGANYIKA T. / Tshibinda [the only gazetted records of Tshibinda are Zaïre – 02°20'S:28°43'E] / 21–27.viii.1931 / Prof T. D. A. Cockerell' (CNCI). UGANDA: 1 ♀, Fort Portal, Nyakasura, Ruwenzori Range [00°40'N:30°17'E], 24.i.1935, F. W. Edwards (BMNH); 1 ♂ 2 ♀, Ruwenzori Mts. [ca. 00°13'N:29°58'E], 23.xii.1972, H. Falke, 2450 m (CNCI).

Graptomyza lutea sp. n.

Figs 52, 57, 62, 67, 74, 78 & 80

Etymology: L. *luteus* = orange or 'of clay', referring to the orange-coloured abdomen.

Body length: 6,00 mm; wing length: 5,67 mm.

Head (Figs 52 & 57): Dark yellow with dark brown bands. Facial tubercle gibbose, with single bump. Epistome projecting beyond facial tubercle, but not beyond A.s.3. Eye black with pale golden pile. FH ratio 0,32:1. Antenna grey. A.s.1 with apical crown dark brown, pale on A.s.2. Aristal vestiture on dorsal surface longer than width of arista at base. A.s.3 long and slender, 3,9 times longer than wide, with fine silver pruinosity. Outer sacculus diameter 0,02 mm, margin raised proximally, situated one-quarter the length from base and just above midway on width of A.s.3. Inner sacculus diameter 0,02 mm, situated directly below base of arista and midway on width of A.s.3. Setae fairly long and golden on epistome, gena, frons and vertex. Long black setae on brown band between tubercle and epistome.

Thorax: Black; dark brown on prepm, ktg, anatg and sbsctl. Scutellar depression small (Fig. 67) 0,31 × 0,18 mm, deep, with brown margin and filled with silver setae. Setae on remainder of thorax short, erect, golden, interspersed with longer setae towards posterior margin of scutum and on scutellum. One median and 2 dc bands of setae on scutum. A discal row of 3 erect, well developed setae around scutellum margin. Subscutellum (except ventral half of dorsal lobe) with silver pruinosity.

Legs: Pale yellow, but dark brown as follows: fore and mid femora (except apical quarter), apical four-fifths of hind femur and apical four-fifths of hind tibia. Mid basitarsus of male narrowly expanded distally to little more than width of tibia apex (Fig. 62). Setae long, golden, intermingled with dark setae on dark parts of hind leg and dorsal surface of hind basitarsus and second tarsomere. Empodium short, not plumose.

Wing: Costal setae tapering to very short at pt. Dorsal surface of Rs proximal to R_1 branch with 12 long setae on both wings. Wing smoky brown, pt brown, infuscation over marginal veins slightly darker. Calypters hyaline, marginal setae short, white.

Abdomen (Fig. 74): Long and narrow, T4 considerably rounded apically; largely orange brown with brown markings: lateral line on T1–3, vague central rectangle on T2–3. Setae golden, moderate in length, alveoli slightly raised, long black setae intermingled with golden setae towards tip of abdomen. Genitalia (Fig. 78): Cercus quadrate. Surstylus stout, sparsely setose on interior surface (Fig. 78b), setae long dorsally on exterior. Hypandrium blunt basally, with wedge-shaped aedeagal guide and pronounced dorsal lobe. Paramere weakly curved, with single thick seta. Basiphallus tubular with overhanging lower margin. Distiphallus a low hood-like structure.

Holotype: ZAÏRE: ♂, 'B.CONGO: / Epulu, 950m. [01°15'N:28°21'E] / X-2-1957'; 'E.S.Ross & / R.E.Leech / collectors'; 'HOLOTYPE [printed in red] ♂ / Graptomyza lutea / A.E.Whittington' [red framed rectangular label, my hand writing] (CASC – Type 16818). In good condition, stuck to a cardboard triangle.

Graptomyza nigra Bezzi, 1915

Figs 53, 58, 63, 68, 71, 75, 79 & 80

Graptomyza nigra Bezzi, 1915: 60; Curran, 1927: 49; Curran, 1938: 14; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *niger* = black, referring to dark colour.

Redescription: Based on male lectotype.

Body length: 7,80 (7,20–8,00) mm; wing length: 7,27 (6,20–7,27) mm.

Head (Figs 53 & 58): Pale yellow, with broad dark brown bands and brown spot below eye. Facial tubercle gibbose, with 3 (2) bumps sharply angled distally. Epistome projecting beyond facial tubercle, as far as end of A.s.3. Eye black with pale golden pile. FH ratio 0,35:1 (0,34–0,35:1). Antenna grey, orange-brown at base of A.s.3 (more extensive in ♀). Three (2) black macrosetae dorsally on A.s.2. Aristal vestiture on dorsal and ventral surfaces, longer than width of arista at base. A.s.3 long and slender, 4,7 (6,4 in ♀) times longer than wide, with fine silver pruinosity. Outer sacculus diameter 0,03 (0,02–0,03) mm, pale brown, situated one-sixth the length from base and one-quarter width from upper margin of A.s.3. Inner sacculus slit-like, small 0,02 × 0,01 mm, situated directly below base of arista and midway on width of A.s.3 (ventrally situated, one-quarter length of A.s.3 from base in ♀). Setae fairly long, pale golden. Long black (sometimes pale golden) setae on vertex and on brown band between tubercle and epistome.

Thorax: Black; yellow on pprn lb, npl, pal cal, posterior margin of scutellum, prepm (brightest); dark buff on hind margin of scutum; dull brown on prepst; dark brown on mr, ktg, anatg; black on sbsctl. Scutellar depression small (Fig. 68) 0,26 × 0,13 (0,21–0,33 × 0,10–0,19) mm, very deep, with brown margin and filled with silver setae. Setae of thorax short, erect, pale, interspersed with longer setae towards posterior margin of scutum and between macrosetae on scutellum. Black setae intermingled with pale setae on hind margin of pprn lb (absent on other specimens), on supra-alar region and posterior margins of scutum and on pal cal. Well developed black macrosetae with 2 anepst (3 on left in Stanleyville ♂), 3 spal (4 on left in ♀), 2 sctl (3 on right in ♀). Subscutellum with silver pruinosity, except on ventral half of dorsal lobe.

Legs: Golden yellow, but dark brown as follows: proximal half of fore femur, mid femur except apex, mid three-fifths of hind femur and apical four-fifths of hind tibia. Mid basitarsus in male expanded to about 1,5 times width of apex of tibia (Fig. 63). Setae long, pale, black on dark parts and on hind basitarsus.

Wing: Dorsal surface of Rs proximal to R_1 branch with 17 (13–17) long setae on right wing and 15 (14–15) on left wing. Following cells lack microtrichia: base of sc and basal two-thirds of bm. Wing smoky brown, pt pale brown, infuscation dark brown (Fig. 71). Calypters hyaline, marginal setae short, white.

Abdomen (Fig. 75): Largely dark brown with golden ochre markings: on T1 a v-shaped, glossy patch below scutellum and anterior and lateral margins; on T2 2 dorsocentral lines, narrow hind margin and lateral margins; on T3 narrow fore margin, 2 dorsocentral lines midway across and narrow lateral and hind margins. Setae pale, moderate in length, alveoli black, long black setae intermingled with pale setae towards tip of abdomen. Genitalia (Fig. 79): Cercus slightly extended into slight dorsal cone on proximal margin. Surstylus blunt, sparsely setose from median area and an isolated basal row on external surface, but setose over entire basal and ventral internal surface (Fig. 79b). Hypandrium wedge-shaped basally, aedeagal guide short. Paramere broad basally, arms high over distiphallus, stout. Basiphallus tubular, broad with indented tip having thickened margins. Distiphallus cone-like, curved dorsally.

Lectotype (here designated): UGANDA: ♂, 'Syn- / type' [circular label with blue margin]; 'Graptomyza [hand written] / ♂ [hand written] Type / nigra [hand written] / Bezzi [hand written]' [circular label with orange margin]; 'Uganda Prot. / Mabira Forest, / Chagwe [00°30'N:32°55'E] / 3,500–3,800 ft. / July 16–25.1911. / S.A.Neave.'; 'Pres. by / Impl. Bureau Ent. / 1915–165.'; 'LECTOTYPE ♂ / Graptomyza nigra / Bezzi, 1915 / designated: A.E. Whittington' [red framed rectangular label, LECTOTYPE printed in black, remainder in my hand writing] (BMNH). In good condition, but left mid tarsus lacks terminal two tarsomeres, both thorax and abdomen pinned through, scutellar macrosetae lost.

Paralectotype: UGANDA: 1 ♀, Mabira Forest, Chagwe [00°30'N:32°55'E], 16–25.vii.1911, S. A. Neave, 3,500–3,800 ft (BMNH).

Additional material examined: ZAÏRE: 1 ♂, Bengamisa, Stanleyville [00°58'S: 25°11'E], 5.ix.1946 [collector not listed] (ISNB). UGANDA: 1 ♀, Mabira Forest, Chagwe [00°30'N:32°55'E], 16–25.vii.1911, S. A. Neave, 3,500–3,800 ft (BMNH).

Discussion: In the original description Bezzi (1915) designated 1 ♂ and 1 ♀ specimens from Mabira Forest in the Uganda Protectorate, each as 'type'. I hereby designate the male as lectotype and the female as paralectotype (see discussion under *G. aurea*).

Undescribed sp. 1

Figs 54, 59, 64, 76b,c & 80

Material examined: CAMEROON: 1 ♂, 12 mls E. Mbalmayo [03°30'N: 11°21'E], 11.x.1966, E. S. Ross & K. Lorenzen, 660 m (CASC).

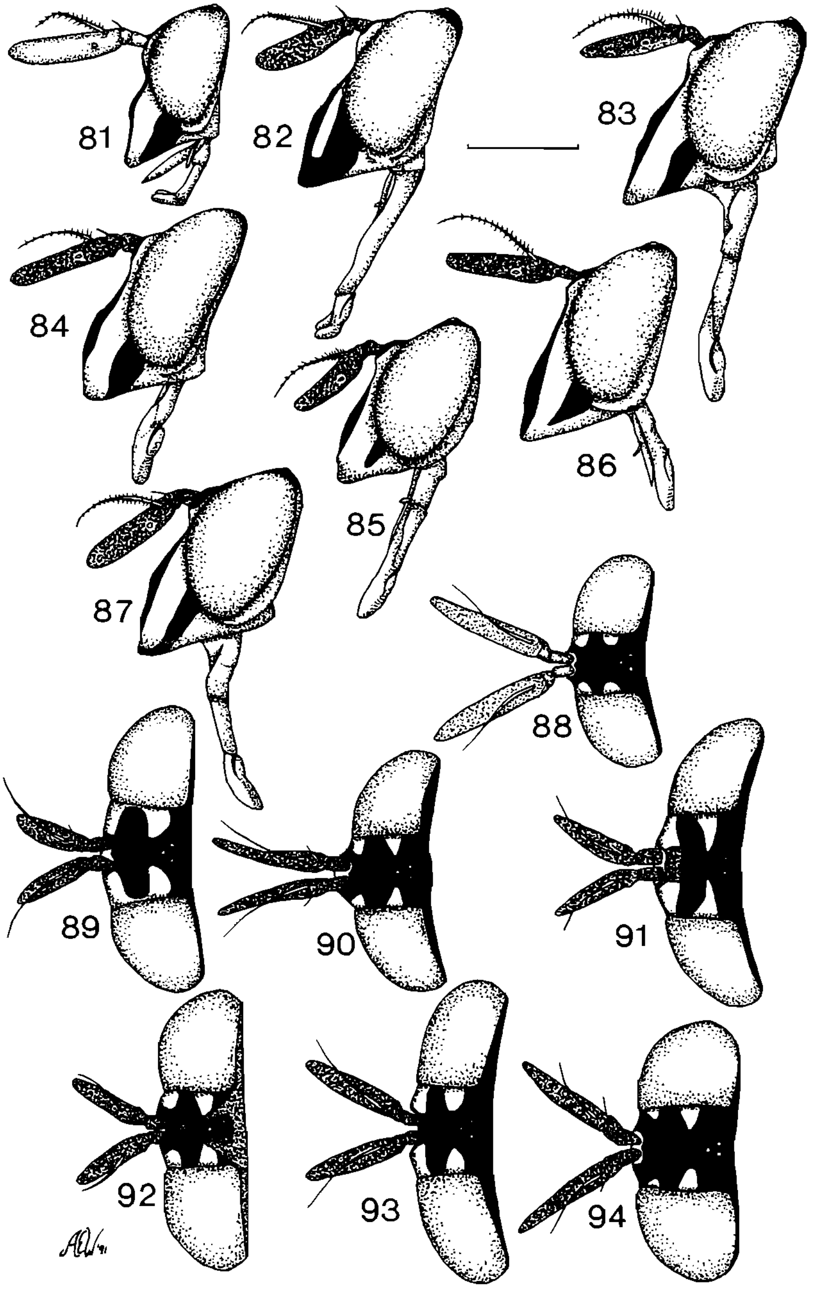
Discussion: This specimen closely resembles *G. aurea*, differing only in the following characters: Body length: 5,93 mm; wing length: 6,13 mm. Markings on frons and vertex composed of 3 colours (Fig. 59). Facial tubercle less pronounced (Fig. 54). Epistome laterally indented in front of gena. FH ratio 0,35:1 (compared with 0,32–0,34:1). A.s.3 4,40 times longer than wide (compared with 4,53–5,03 in *G. aurea*). Pprn lb white (yellow in *G. aurea*). Scutellar depression smaller (similar to Fig. 65), 0,29 × 0,13 mm (0,37 × 0,24 mm in *G. aurea*). Dorsal Rs setae about 1,5 times longer. Middle basitarsus in male slightly narrower (Fig. 64). Wing membrane lacks infuscation. The male genitalia (Figs 76b,c) are very similar to those of *G. aurea* (Fig. 76a), except that the paramere is slightly less pointed and the distiphallus narrower.

These characters are too indefinite and the single male too damaged to conclusively describe this as a new species. Nevertheless, attention is drawn to the specimen and the fact that a sister species to *G. aurea* may yet be described.

varia species group

Diagnosis: Stout spines on hind tibia (Figs 95–101). Dark chevron markings on abdomen (Figs 116–121).

Additional characters (shared by all members of this species group, but also present in other species groups):
Brown bands on facial tubercle from antennal base to margin of epistome, across gena from eye margin to tip of epistome and on frons and vertex (Figs 81–94).



Figs 81–94. *varia* species group. 81 & 88. *G. nigricavum*. 81. Head, lateral view. 88. Head, dorsal view. 82 & 89. *G. signata*. 82. Head, lateral view. 89. Head, dorsal view. 83 & 90. *G. triangulifera*. 83. Head, lateral view. 90. Head, dorsal view. 84 & 91. *G. varia*. 84. Head, lateral view. 91. Head, dorsal view. 85 & 92. *G. xanthopoda*. 85. Head, lateral view. 92. Head, dorsal view. 86 & 93. Undescribed sp. 2. 86. Head, lateral view. 93. Head, dorsal view. 87 & 94. Undescribed sp. 3. 87. Head, lateral view. 94. Head, dorsal view. (Scale bar = 1 mm).

Occiput dark brown to black. Eye brown to red brown with moderate pile of pale golden setae. Antennal tubercle bordered with brown. Outer sacculus positioned between one-quarter and one-third the length and midway on width of A.s.3. Facial setae black on antennal tubercle, A.s.1 and A.s.2 and on facial tubercle. Thorax pale yellow on prepm, pprn lb and posterior half of anepst. Macrosetae: 2 anepst, 2 sctl; numerous black setae between sctl macrosetae. Leg setation conspicuously longer on posterior margins. Distal half of hind basitarsus and remaining tarsomeres with ventral combs of setae. Abdominal setae pale golden. Genital shield without spines.

Included species: *G. nigricavum* sp. n., *G. signata* (Walker, 1860), *G. triangulifera* (Bigot, 1883), *G. varia* (Walker, 1849), *G. xanthopoda* Bezzi, 1915, Undescribed spp. 2 and 3.

Distribution: Widespread over the whole Afrotropical range of the genus, from Boloma (Guinea Bissau) in the west to the East Usambara mountains (Tanzania) in the east and from Imatong (Sudan) in the North to Mossel Bay (South Africa) in the south (Fig. 125). This distribution covers a wide range of habitat types, especially by the species *G. signata* and *G. triangulifera*, which appear to be generalists. Adult *G. signata* have been collected from flowers of unnamed Compositae and *Bidens pilosa* L., and reared from unspecified rotting fruit, unspecified pods and tomato fruits. Adults of *G. triangulifera* have also been reared from unspecified pods. *G. signata* and *G. triangulifera* are frequently caught at house windows and commonly found after rain. No biological information is available for the other species.

Graptomyza nigricavum sp. n.

Figs 81, 88, 95, 102, 109, 116, 122 & 125

Etymology: L. *niger* = black, L. *cavum* = hollow, referring to the black scutellar depression.

Body length: 5,42 mm; wing length: 4,93 mm.

Head (Figs 81 & 88): Yellow with brown markings, black on centre of frons and over ocellar triangle. Facial concavity deep; tubercle not greatly pronounced. Epistome projecting no further than middle of A.s.3. FH ratio 0,30:1. Antenna grey. Arista ochre darkening to brown apically, vestiture similar in length to width of arista at base. A.s.3 with fine silver pruinosity; 4,5 times longer than wide. Outer sacculus small, circular 0,02 mm. Inner sacculus slit-like (0,06 × 0,02 mm), one-quarter the length and just below midway on width of A.s.3. Setae long on vertex, absent on central area of face between antennae and facial tubercle.

Thorax: Black; pale yellow on lateral and hind edges of scutum, prepst, and npl; brown on anepm, kepm, mr, ktg, anatg and interfaces between black and pale yellow; scutellum brown, with dark ochre hind margin and ventral surface. Scutellar depression large (Fig. 109) 0,63 × 0,42 mm, dark brown, pitted, with recumbent pale brown setae meeting as single erect tuft on hind margin. Two npl macrosetae. Subscutellum with white pruinosity, bare on ventral half of dorsal lobe.

Legs: Pale ochre, but distal half of hind femur and entire hind tibia brown. Setae pale golden, intermingled with black setae on apex of femora, brown parts of hind leg and dorsal surfaces of hind tarsomeres. Three black apical av spines on hind tibia (Fig. 95).

Wing: Dorsal surface of Rs proximal to R_1 branch with 9 long setae on right wing, 7 on left. Pterostigma brown, slightly darkened proximally by first band of infuscation. Following cells lack microtrichia: entire asc and ac, base of cup. Wing membrane hyaline, infuscation smoky brown (fig. 102). Haltere pale ochre.

Abdomen (Fig. 116): Pale ochre, with following dark brown markings: on T1 a semicircular lobe each side of midline on posterior margin, not meeting medially and not extending to lateral margins, continuing as lateral bands over rest of abdomen; on T2 a triangle medially; on T3 and T4 a median rectangle. Setae black on apex of T4. Alveoli small, but raised. Genitalia (Fig. 122): Cercus quadrate. Surstylus blunt, indented ventrally near base, sparsely setose, external surface with few strong setae dorsally and a distinct group of setae at base of ventral margin, only around ventral margin on internal surface (Fig. 122b). Hypandrium broad basally, with small dorsal lobe, aedeagal guide pointed. Paramere broad basally, arms long, arching lateral to distiphallus and turned strongly outwards. Tip of basiphallus with thickened margins, basal hooks well developed. Distiphallus tall with rounded top. Genital shield weakly developed.

Holotype: KENYA: ♂, 'KENYA: 14mi.NE. / of Nakuru [ca. 00°05'S:36°04'E] 7200' / 16-xii-1969 / M. E. Irwin & / E. S. Ross'; 'HOLOTYPE [printed in red] ♂ / Graptomyza nigricavum / A.E.Whittington.' [red framed rectangular label, my hand writing] (CASC – Type 16819).

Graptomyza signata (Walker, 1860)

Figs 1, 82, 89, 96, 103, 110, 117, 123 & 125

Paragus signatus Walker, 1860: 288.

Graptomyza vittigera Bigot, 1884: 321; Kertész, 1910: 206 (catalogue); Bezzi, 1912: 413; Bezzi, 1915: 55; Curran, 1927: 49; Curran, 1938: 14; van Doesburg, 1955*b*: 359; Smith & Vockeroth, 1980: 497 (catalogue, first indication of synonymy).

Graptomyza signata: Bezzi, 1915: 56; Curran & Bryan, 1926: 82; Curran, 1927: 49; Curran, 1938: 14; van Doesburg, 1955*b*: 359; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *signatum* = marked, referring to the markings on the abdomen.

Redescription: Based on female holotype.

Body length (not available for holotype): (4,87–5,80 mm in ♂; 6,53–7,53 mm in ♀); wing length: 5,73 mm (4,00–4,47 mm in ♂; 5,13–5,73 mm in ♀).

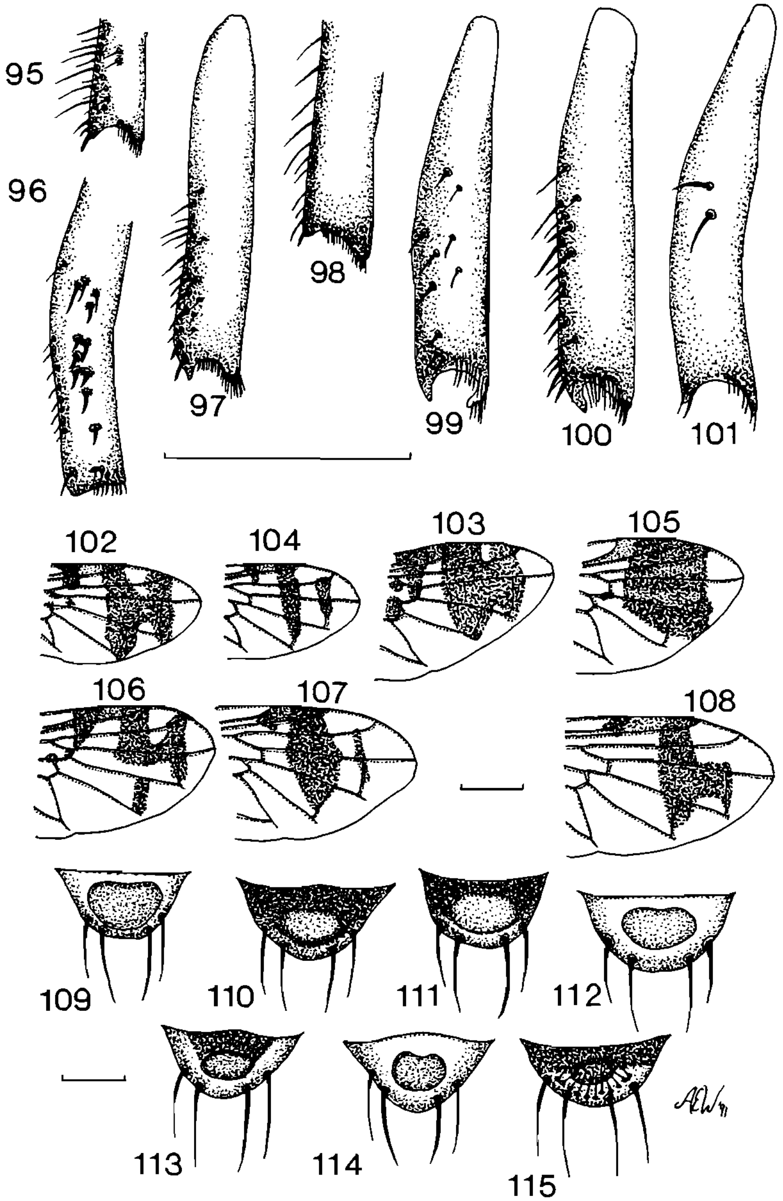
Head (Figs 82 & 89): Missing in holotype. Yellow with brown bands. In male, band on gena arising from frontogenal suture and band absent on facial tubercle. Pattern on frons and vertex brown darkening to black on apical lobes and over ocellar triangle. Facial tubercle not greatly pronounced. Epistome projecting no further than middle of A.s.3. FH ratio 0,45–0,48:1 in male and 0,37–0,40:1 in female. Antenna ochre. Arista ochre darkening to brown apically, vestiture similar in length to width of arista at base. A.s.3 darker on dorsal half with fine silver pruinosity, sinuously curved in male, straight and apically rounded in female; 3,03–3,92 times longer than wide in male, 3,28–4,20 in female. Outer sacculus small, circular 0,02 mm, one-third the width of A.s.3 from upper margin of segment (at edge of brown dorsal coloration anterior to aristal base). Inner sacculus slit-like (0,06 × 0,02 mm), one-quarter the length and just below midway on width of A.s.3. Setae: long on vertex, absent on central area of face between antennae and facial tubercle.

Thorax: Black; pale yellow on lateral and hind edges of scutum, prepst, npl (sometimes very pale ochre); brown on anepm, kepm, ktg, anatg, scutellum and interfaces between black and pale yellow; dark ochre on hind margin, ventral surface of scutellum (Fig. 110) and dorsal, convex lobe of sbsctl. Scutellar depression large (Fig. 110) 0,52–0,77 × 0,26–0,39 mm, dark brown, pitted, with recumbent pale brown setae, erect and meeting as single tuft on hind margin. Setae on remainder of thorax long (shorter on dorsal surface of scutum), pale golden. Two npl macrosetae. Subscutellum with central patch of very fine, white setae.

Legs: Pale ochre (sometimes very pale), distal half of hind femur and entire hind tibia brown. Setae pale golden, intermingled with black setae on brown areas of hind legs. Numerous black spines on ventral hind tibia, medially positioned (Fig. 96) with few small spines distally. Distal half of hind tibia and all tarsomeres with ventral setae dense and thickened. Empodium not plumose.

Wing: Base of costa with 3 black macrosetae. Dorsal surface of Rs proximal to R_1 branch with 11 (5–11) long setae on right wing, 12 (5–12) on left. Pterostigma yellowish, slightly darkened proximally by first band of infuscation. Following cells lack microtrichia: entire asc and ac, base of cup. Wing membrane hyaline, infuscation smoky brown (Fig. 103). Haltere orange brown.

Abdomen (Fig. 117): Dark ochre (sometimes very pale), with following dark brown markings (ochre sometimes very dark making markings indistinct): on T1 a semicircular lobe each side of midline on posterior margin, not meeting medially and not extending to lateral margins; on T2 an inverted 'v'-shape medially, starting at one-fifth segment length (triangular, with sub-quadrate very pale area from proximal half of triangle to proximal border of segment in Mangochi (Malaŵi) ♀), a band on lateral margin with indistinct narrow band between the 2 broadening posteriorly; on T3 a narrow band from each end of marking on T2 to posterior margin, with marginal band and broad band in between; on T4 similar, but median bands narrow and lateral pair joining basally. Genitalia (Fig. 123): Cercus rounded. Surstylus blunt, indented ventrally near base, setose on external surface except on a band from medial basal area across to indentation on ventral margin; setae on internal surface fine and at tip only (Fig. 123b). Hypandrium narrow basally, with pronounced laterodorsal lobe, aedeagal guide stout and set towards base. Paramere broad basally, arms long, arching lateral to distiphallus and turned strongly outwards. Basiphallus and distiphallus united, basiphallus with bilobed tip. Genital shield weakly developed.



Figs 95–115. *varia* species group. 95, 102 & 109. *G. nigricavum.* 95. Hind tibia, ventral view. 102. Wing, apical half. 109. Scutellum, dorsal view. 96, 103 & 110. *G. signata.* 96. Hind tibia, ventral view. 103. Wing, apical half. 110. Scutellum, dorsal view. 97, 104 & 110. *G. triangulifera.* 97. Hind tibia, ventral view. 104. Wing, apical half. 111. Scutellum, dorsal view. 98, 105 & 112. *G. varia.* 98. Hind tibia, ventral view. 105. Wing, apical half. 112. Scutellum, dorsal view. 99, 106 & 113. *G. xanthopoda.* 99. Hind tibia, ventral view. 106. Wing, apical half. 113. Scutellum, dorsal view. 100, 107 & 113. Undescribed sp. 2. 100. Hind tibia, ventral view. 107. Wing, apical half. 114. Scutellum, dorsal view. 101, 108 & 115. Undescribed sp. 3. 101. Hind tibia, ventral view. 108. Wing, apical half. 115. Scutellum, dorsal view. (Scale bars = 1 mm).

Holotype: SOUTH AFRICA: ♀, 'Holo- / type' [circular label with red margin]; 'Paragus [hand written] / Type / signatus [hand written] / Walk. [hand written]' [circular label with green margin]; 'Natal' [hand written]; 'signatus' [hand written]; 'S.Africa: / Natal / Ex.coll. / W.W. Saunders. / 68.4.' [hand written] (BMNH). Type in poor condition, head missing and abdomen detached (in gelatine capsule).

Additional material examined: SUDAN: 1 ♀, Imatong, Lomarti [03°53'N: 32°43'E], 30.i.1982, Mrs S. Parker, 3,500 ft (NMKE). UGANDA: 1 ♀, Masindi [01°41'N: 31°43'E], viii.1945, P. A. Buxton (BMNH); 1 ♀ 1 ♂, Entebbe [00°04'N: 32°28'E], 7.ix., 16.x.1971, H. Falke, lakeside swamp (CNCI). KENYA: 1 ♀ 4 ♂, Nairobi [01°17'S:36°49'E], vii.1930, vii.1937, van Someren, caught on Composite (BMNH); 1 ♀, Karen [01°20'S:36°42'E], 16-21.i.1970, M. E. Irwin & E. S. Ross, 5800 ft (CASC). TANZANIA: 1 ♂, Mt. Meru [03°14'S: 36°45'E], iv.1962, 1500m (CNCI); 2 ♀ 1 ♂, Same [04°04'S:37°41'E], 25.v.1962 (CNCI); 1 ♀, Magango 'a. Victoria See' [04°12'S:35°02'E?], 19–25.iii.1952, D. O. Afrika Exp. (SMNS); 2 ♀, Msingi [04°20'S:34°34'E], 22–28.i.1952, 1–19.v.1952, D. O. Afrika Exp. (SMNS); 1 ♀, Kilossa [06°49'S:37°00'E], 11.xii.1920, A. Loveridge (MCZC); 1 ♀, Morongo [08°00'S:37°00'E], i.1963, G. Heinrich (CNCI). ZAÏRE: 1 ♀, 7 mls NW. Jadotville [10°59'S:26°44'E], 27.i.1958, E. S. Ross & R. E. Leech, 1350m (CASC). ZAMBIA: 1 ♀, Chilanga [15°39'S:28°19'E], 6.x.1913, R. C. W. [collector?], in home (CNCI). MALAŴI: 1 ♀, 35 km N. Mangochi and 10 km N. Club Makokola [14°13'S:35°44'E], 10–11.iii.1987, J. & A. Londt, sandy grassveld (NMSA); 1 ♀, Blantyre [15°47'S: 35°00'E], xii.1957, B. & P. Stuckenberg (NMSA); 1 ♀, Mlanje [15°57'S: 35°36'E], xii.1944, Nat. Museum S.Rhodesia, 2,000 [ft] (NMBZ); 1 ♂, Cholo [16°04'S:35°08'E], R. C. Wood (BMNH). ZIMBABWE: 5 ♀ 4 ♂, Harare [17°50'S:31°03'E], 15.v.1932, x. and xii.1934, i.1935, 14.iv.1973. 12.iii.1990, A. Cuthbertson, P. E. Hulley ('Bee-like abd./tip dipping'), R. M. Miller, indoors, at light (PPRZ, AMGS, NMSA); 2 ♀, Harare [17°50'S:31°03'E], 24.iv.1950, Department of Agriculture, Entomology Laboratory, ex tomato fruit (BMNH); 1 ♀, N. Vumba [18°19'S:29°50'E], 4.iii.1965, D. Cookson (NMSA); 2 ♀ 3 ♂, Umtali [18°58'S:32°40'E], 24.xii.1953, i.1955, N. J. M. [collector?], B. R. S. P. G. [Stuckenberg & Graham] (NMSA); 8 ♀ 2 ♂, Bulawayo [20°09'S:28°35'E] 5.iii.1925, 9.iii.1925, 25.iii.1925 (NMBZ). MOZAMBIQUE: 1 ♀, Siluwe Hills west of Beira [co-ordinates not known], 3.vi.1964, D. Cookson (NMSA). SOUTH AFRICA: *Transvaal*: 1 ♂, Louis Trichardt [23°03'S:29°54'E], i-ii.1928, R. F. Lawrence (SAMC); 1 ♀ 2 ♂, Tzaneen [23°50'S:30°10'E], reared from rotting fruit ii.1981, hatched 28.iv.1981 (NMSA); 4 ♂, Warmberg, Pietersburg district [24°12'S:29°41'E], i.1900, xii.1903, iv.1904, A. J. T. Janse (NMSA); 1 ♂, 'W.B [almost illegible; Warmberg? 24°12'S: 29°41'E suggested by van Doesburg (1955*b*)], 11.3.04 [in pencil]' (NMSA); 5 ♀ 1 ♂, Pretoria, Roodeplaat [25°37'S:28°22'E], xi.1957, iv.1958, v.1958, J. Bot, ex alc. ether (SANC); 3 ♀ 2 ♂, Pretoria [25°45'S:28°10'E], 13.xi.1918, 23.xi.1918, 6.i.1919, ix.1978, H. K. Munro, [collector unknown], G. Ferreira, Malaise trap (SANC); 1 ♀, Barberton [25°47'S:31°03'E], iv.1911, Edwards

(SAMC). *Natal*: 1 ♂, Madlangula, Kosi Bay, 26°53'S:32°55'E, 22.i–6.ii.1985, R. Kyle (NMSA); 1 ♀, Ndumu Reserve, Ingwavuma district, Zululand [26°55'S:32°15'E], 1–10.xii. 1963, B. & P. Stuckenberg (NMSA); 2 ♀, Itala Game Reserve, Craig Adam Dam, 27°28'S:31°25'E, i.1991, R. M. Miller, Malaise trap (NMSA); 1 ♀ (plus 1 ♀ unlabelled, probably same data), Ngome [27°48'S:31°26'E], 1.i.1981, inside home at window (NMSA); 1 ♀ 1 ♂, Mfongosi, Zululand [28°43'S:30°48'E], iii–iv.1934, iii–iv.1935, W. E. Jones (SAMC); 2 ♀, Weenen [28°51'S:30°05'E], v.1924, ix–x.1925, H. P. Thomasset (BMNH); 1 ♀, University of Zululand [28°51'S:31°51'E], 28.i.1989, P. E. Reavell, 75 m (NMSA); 2 ♀, Eshowe [28°55'S:31°20'E], 1937 (BMNH); 1 ♀, Eshowe, Dlinza Forest Nature Reserve [28°55'S:31°20'E], 22.xii.1979, R. Miller & P. Stabbins, indigenous forest, 450m (NMSA); 1 ♂ 1 ♀, 1,5 km E. Mtunzini, Umlalazi Nature Reserve [29°00'S:31°45'E], xi.1978, i.1979, R. M. Miller, indigenous forest, Malaise trap (NMSA); 3 ♀, Pietermaritzburg [29°37'S:30°23'E], iv.1956, 14.iii.1957, 15.v.1962, B. Stuckenberg, J. W. Boyes (CNCI, NMSA); 1 ♀ 2 ♂, Pietermaritzburg, Scottsville [29°38'S:30°24'E], 1–7.iv.1986, 1–12.v.1986, 29.iv.1990, R. M. Miller, Craig Brichson, Malaise trap, at window (NMSA). 2 ♂ 2 ♀, University of Natal, Ukulinga Research Farm, 10 km SE. Pietermaritzburg [29°40'S:30°24'E], 3–10.ix.1985, 18–30.ix.1985, 27.xi–4.xii.1985, 6-12.ii.1986, R. M. Miller, dam margin, grassland impoundment, Malaise trap (NMSA); 1 ♂ 2 ♀, Ashburton, 15 km SE. Pietermaritzburg [29°40'S:30°46'E], ii.1977, 10.ix.1988, 18.xii.1991, J. G. H. Londt, Raymond. M. Miller, Malaise in Grassland, on window (NMSA); 1 ♀, Gillitts [29°47'S:30°48'E], 9.v.1926, HWBM [collector?] (NMSA); 1 ♂ (*G. vittigera* **holotype**), 'Holo- / type' [circular label with red margin]; 'Graptomyza [hand written] / Type / vittigera, [hand written] / Big. [hand written]' [circular label with orange margin]; 'S.Africa: Port Natal [29°51'S:31°01'E] / Ex. coll. Bigot / Pres. by / G. H. Verrall / 94.234.' [hand written]; 'G.Vittigera ♂ / Ann. Soc. Ent. [in pencil] / Fr.1883,321. [in pencil] Natal.port. Type [in pencil, underlined] J.Bigot.' [hand written Bigot label] (BMNH); 4 ♀, Durban [29°51'S:31°01'E], 14.ix.1921, 22.ix.1921, 6.vii–16.viii.1932, 2-15.ix.1932, W. E. Marriott, bait trap (SANC); 1 ♀, Umbilo, Durban [29°51'S:31°01'E], 9.xii.1928, A. L. Bevis (CNCI); 1 ♀, Ixopo District, Mackston, 30°01'S: 30°18'E, 16–17.iv.1977, Raymond M. Miller (NMSA); 1 ♀, Port Shepstone [30°45'S:30°27'E], 29.iv.1926, H. K. Munro (SANC); 1 ♀, Mtentwana, 31°05'12''S:30°11'08''E, 30.x.1990, A. E. Whittington, Coastal bush (NMSA). *Cape*: 1 ♂, Port St. Johns [31°38'S:29°32'E], 6–25.ii.1924, R. E. Turner (BMNH); 1 ♂, Tarkastad [32°01'S:26°16'E], iv.1946, L. C. McLean (AMGS); 1 ♂, Fort Beaufort, Umdala [32°47'S:26°28'E], iii.1954, S. A. Museum (SAMC); 1 ♀, Hogsback [32°35'S:26°56'E], 19.xi.1988, C. Roux (SANC); 7 ♀ 2 ♂, East London [33°02'S:27°55'E], 25.ii.1922, ii.1922, iii.1922, H. K. Munro, 'Ac.E.L./89' 'Ac.P/2496' (CNCI, SANC); 2 ♀, 'Ac.E.L. / 89' [=East London? 33°02'S:27°55'E] (SANC); 3 ♀, East London [33°02'S:27°55'E], ii–iii.1922, iii.1922, H. K. Munro, 'M.22' (SANC, BPBM, USNM); 3 ♀ 3 ♂ (2 ♀ with puparia, 2 puparia alone), 'M.22' [= East London? 33°02'S:27°55'E] (SANC); 1 ♀ 1 ♂, Ft Brown [33°08'S:26°38'E], 1.iv.1929 or 7.iii.30 [both on label], Miss Walton (AMGS); 1 ♂, Ft Brown [33°08'S:26°38'E], 18.iii.1929 or 17.iv.1929 [both on label], Miss Walton, (AMGS); 1 ♀ 2 ♂, Resolution, Grahamstown [33°10'S:26°37'E], i–iv.1928, 1929, 1930, Miss Walton (SAMC); 8 ♀ 8 ♂, Resolution, Albany District [33°10'S:26°37'E], 13.x.1927, 19.x.1927, 20.x.1927, 21.x.1927, 3.xii.1927, 25.xii.1927, 3.i.1928, 4.i.1928, 11.ii.1928, 8.iii.1928, 4.i.1929, 17.i.1929, A. Walton (NMSA); 1 ♀, Willowmore [33°15'S: 23°30'E], xi.1912, Dr Brauns (NMSA); 1 ♂, Governors Kop near Grahamstown [33°18'S:26°43'E] (AMGS); 3 ♀, Grahamstown [33°18'S:26°32'E], 17.xii.1952, 7.iii.1961, vi.1967, B. Stuckenberg, C. Jacot-Guillarmod, D. Jordan (NMSA, AMGS); 15 ♀ 3 ♂, Hilton, Grahamstown [33°19'S:26°32'E], dates between 12.xi.1970 and v.1971. F. W. Gess, Malaise trap (AMGS); 17 ♀ 7 ♂, Belmont Valley, Grahamstown [33°19'S:26°32'E], dates between 18.x.1971 and 3.i.1972, 4-17.v.1982, F. W. Gess, Malaise trap (AMGS); 1 ♀, Belmont Valley, 3 km E. Grahamstown [33°19'S:26°32'E], 2–5.i.1986, J. & B. Londt, Malaise (NMSA); 14 ♀ 11 ♂, Table Farm, Grahamstown [33°19'S:26°32'E], dates between 12.ii.1971 and 24.iii.1971, F. W. Gess, Malaise trap (AMGS); 6 ♀, Howison's Poort, Grahamstown [33°19'S:26°32'E], 19–22.xi.1971, 29-30.xi.1971, 1–6.xii.1971, 14–20.xii.1971, 23–28.xii.1971, F. W. Gess, Malaise trap (AMGS); 1 ♂, Dunbrody [33°28'S:25°33'E], 1901, J. A. O'Niel (SAMC); 1 ♂, Addo district, Sundays River Valley [33°34'S:25°41'E], 29.xii.1977–12.i.1978, J. G. H. Londt, ex Malaise (NMSA); 3 ♀, Money's Worth near Kwiega River Mouth [33°38'S:29°19'E], 18–19.ii.1960, 10.iii.1960, D. Galpin (AMGS); 1 ♂ 1 ♀, Kenton-on-Sea [33°41'S:26°41'E], 26–31.x.1971, 19–27.i. 1981, R. A. Jubb, F. W. Gess, Malaise trap (AMGS); 3 ♀, Uitenhage, De Hoek [33°45'S:25°25'E], 13 and 15.iii.1919, H. K. Munro (SANC); 4 ♀ 3 ♂, Port Elizabeth [33°58'S: 25°35'E], 10.i.1924 (SANC); 2 ♂, Walmer, Port Elizabeth [33°58'S:25°35'E], 12.1964–1.1965, F. W. & S. K. Gess (AMGS); 9 ♀ 1 ♂, Mossel Bay [34°12'S: 22°08'E], iv.1921, v.1921, 1–13.iii.1922, iii–iv.1930, 15.iii–20.iv.1932, iv.1933, viii.1938, R. E. Turner (BMNH, CNCI). SWAZILAND: 1 ♂ 1 ♀, 13 km N. Ngogolo, Panata Ranch, 26°19'S:31°38'E, 22–24.iv.1991, J. Londt & L. Schoeman, bushveld (NMSA).

Graptomyza triangulifera (Bigot, 1883)

Figs 83, 90, 97, 104, 111, 118, 124 & 125

Ptilostylomyia triangulifera Bigot, 1883: cxiv [1884: 322].

Graptomyza triangulifera: Bezzi, 1912: 413; Bezzi, 1915: 55, 56; Curran & Bryan, 1926: 82; Curran, 1927: 49; Curran, 1938: 14; van Doesburg, 1955*a*: 353; Kertész, 1910: 206 (catalogue); Szilády, 1942: 91; Smith & Vockeroth, 1980: 497 (catalogue).

Graptomyza pentaspila Bezzi, 1908: 381; Bezzi, 1912: 413; Bezzi, 1915: 56 (synonymy); Smith & Vockeroth, 1980: 497 (catalogue).

Graptomyza melanura Bezzi, 1908: 381; Bezzi, 1912: 412, 413; Bezzi, 1915: 56 (synonymy), 55; Smith & Vockeroth, 1980: 497 (catalogue).

Graptomyza liberiae Greene, 1949: 78. **syn. n.**

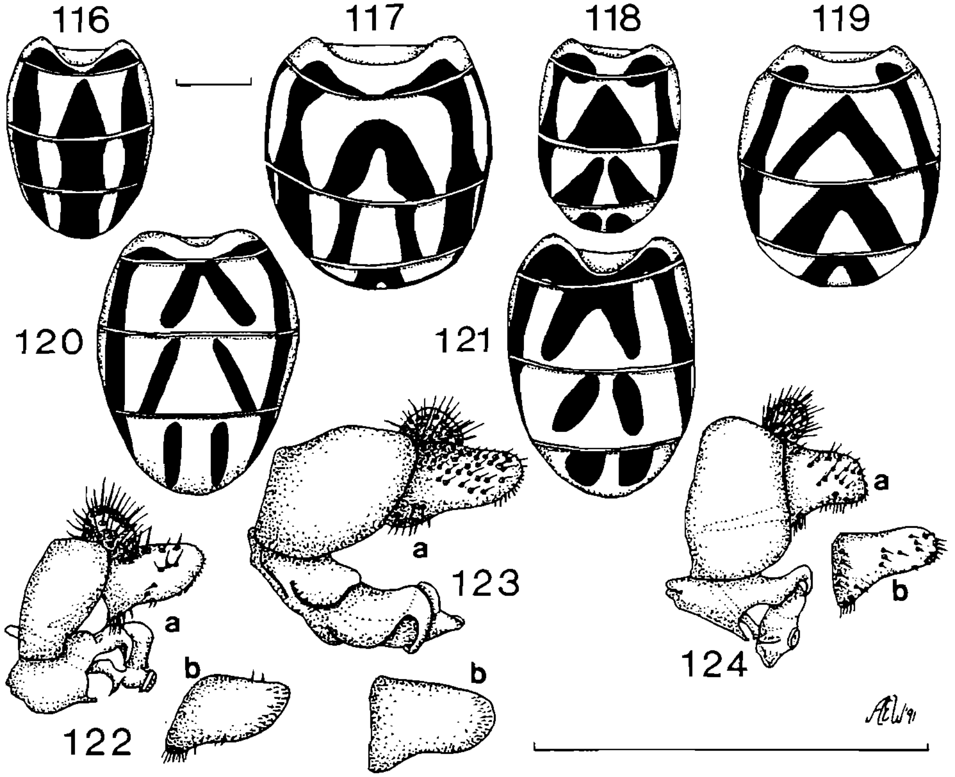
Etymology: L. *triangulus* = triangular, L. *-fera* = suffix to carry or bear, referring to triangular pattern on the abdomen.

Redescription: Based on male holotype.

Body length: not available for holotype (4,61–6,77 mm); wing length: 4,27 (3,58–5,80) mm.

Head (Figs 83 & 90): Pale yellow with brown markings. Facial concavity poorly developed. Facial tubercle gibbose with 2 bumps. Epistome projecting no further than middle of A.s.3. Eye dark grey. FH ratio 0,28:1 (0,27–0,30:1). Antenna grey, ochre basoventrally. Arista ochre, darkening to black apically, dorsal vestiture longer than width of arista at base, slightly shorter ventrally. A.s.3 with silver pruinosity; (2,73–4,75) times longer than wide. Outer sacculus ochre, oval (0,05 × 0,02) mm, situated one-third the length of A.s.3 from base. Setae: absent between antennae and facial tubercle.

Thorax: Black; ochre on lateral edges of scutum, posterior margin of scutellum and dorsal half of sbsctl; bright ochre on prepm. Scutellar depression dark brown, large (Fig. 111) (0,27–0,55 × 0,19–0,31 mm) and shallow. Two npl macrosetae. Subscutellum with silver pruinosity.



Figs 116–124. *varia* species group. 116 & 122. *G. nigricavum*. 116. Abdominal pattern, dorsal view. 122. Male genitalia. a. Lateral view. Surstylus, inner view. 117 & 123. *G. signata*. 117. Abdominal pattern, dorsal view. 123. Male genitalia. a. Lateral view. b. Surstylus, inner view. 118 & 124. *G. triangulifera*. 118. Abdominal pattern, dorsal view. 124. Male genitalia. a. Lateral view. b. Surstylus, inner view. 119. *G. xanthopoda*, abdominal pattern, dorsal view. 120. Undescribed sp. 2, abdominal pattern, dorsal view. 121. Undescribed sp. 3, abdominal pattern, dorsal view. (Scale bars = 1 mm).

Legs: Ochre, distal half of hind femur and entire hind tibia dark brown. Setae pale, darker on dark markings, with an anterodorsal row of prominent setae on dark part of hind femur and ventral spines continuous medially to distally on hind tibia (Fig. 97).

Wing: Base of costa with 2 black macrosetae. Dorsal surface of Rs proximal to R_1 branch with 16 (10–17) long setae on left wing and (11–18) on right wing; dorsal surface of M just proximal to branch bm-cu with 4 (2–5) such setae on each wing. Pterostigma hyaline with proximal and distal third brown, continuous with infuscation. Wing hyaline, infuscation smoky (Fig. 104). Haltere pale orange brown.

Abdomen (Fig. 118): Dark ochre with brown markings as follows: on T2 a forward pointing triangle, T3 a forward pointing 'V' medially (often triangular), with lateral narrow bands near margins of segments, 'V' on T4 not complete (often a trapezium), but appearing as 2 bands across segment, lateral bands similar to other segments. Setae dark over brown markings. Genitalia (Fig. 124): Cercus rounded. Surstylus stout and blunt apically, with slight basal indention on ventral margin; setose on outer surface over all but area between indentation on ventral margin and medial basal area; setose basally and apically on inner surface (Fig. 124b). Hypandrium basally bilobed, aedeagal guide narrow. Paramere broad basally, arms high over distiphallus. Basiphallus and distiphallus united. Basiphallus with conical indentation and thickened margins and with ventral spur. Distiphallus bulbous. Genital shield well developed.

Holotype: SIERRA LEONE: ♂, 'Holo- / type' [circular with red margin]; 'ex.coll. Bigot. / Pres. by / G.H.Verrall. / B.M. 1894-234'; 'G.Triangulifera ♂ [sign inverted] / Ann.Soc.Ent.Fr. 1883, 322. [in pencil] / Sierra-Leon The Type [in pencil, underlined] J.Bigot.' [in Bigot's hand writing, white label with black border] (BMNH). In poor condition, head and abdomen glued on with excessive amounts of glue, the abdomen upside-down. Antenna and all legs (except front right femur and tibia) missing.

Additional material examined: GUINEA BISSAU: 1 ♂, Bolama [11°35'N: 15°30'W], 'vi.xii.1899'. L. Fea (MCSN). LIBERIA: 1 ♂ (*G. liberiae* **holotype**), '2 July 45 / R F L ' [assumed collected by M. S. Briscoe] (USNM); 7 ♀ 1 ♂ (*G. liberiae* **paratypes**), 20.vi.1945, 22.vi.1945, 28.vi.1945, 2.vii.1945, 6.viii.1945 [M. S. Briscoe] (USNM); 1 ♀ (*G. liberiae* **allotype**), 2.vii.1945 [M. S. Briscoe] (USNM). IVORY COAST: 1 ♀, Toulépeu [06°37'N:08°27'W], 18.viii.1966, E. S. Ross & K. Lorenzen, 250m (CASC). GHANA: 2 ♂, Obuasi, Ashanti [06°55'N:01°41'W], 20.xi. and 28.vii.1907, Dr. W. M. Graham, caught in bush (BMNH, CNCI); 6 ♂, Kumasi [06°41'N:01°37'W], 30.vi.1947, 6.ix.1947, J. Bowden (NMSA); 2 ♀, Tafo [06°13'N:00°22'W], WACRI, pod caged 15.xi.1964, larva emerged & pupated 22.i.1965, adult emerged 2.ii.1965 and pod 15.xi.1964, caged 2.ii.1965, adult emerged 3.ii.1965 (BMNH); 1 ♀, Adamso, 06°05'N: 01°45'W, 7.viii.1969, W. P. Murdock Jr (USNM). NIGERIA: 1 ♀, Zaria, Dumbi Wood [Zaria Forest Reserve? 11°04'N:07°42'E], 3.x.1971, J. C. Deeming (NIAR); 1 ♀ 1 ♂, Oshogbo [07°46'N:04°34'E], 10.x.1910 and xi.1910, Dr. T. F. G. Meyer, caught in house during rain (BMNH); 1 ♀ 1 ♂, Ilfe-Ife [Ile-Ife?

07°28′N:04°34′E], 25.v.1969 and 2.viii.1969, Col. J. T. Medler (BMNH, USNM); 4 ♀ 1 ♂, Ibadan [07°23′N:03°56′E], 3.ix.1962, 10.ix.1962, 15.x.1962, 17.x.1962, D. C. Eidt, Malaise trap (CNCI); 3 ♀ 1 ♂, Olokemeji, Ibadan [07°23′N:03°56′E], [puparia with 2 ♀ & 1 ♂)] (BPBM); 4 ♀, 30 mls S. Ibadan [ca. 07°00′N:03°56′E], 9.ix.1966, E. S. Ross & K. Lorenzen, 50 m (CASC); 1 ♂, Ilaro Forest, West State [06°47′N:03°04′E], 30.ix.1973, J. Riley (NIAR); 1 ♀, Sapoba [06°04′N:05°52′E], 10.x.1962, D. C. Eidt, Malaise trap (CNCI). CAMEROON: 2 ♀ 2 ♂, Lolodorf [03°17′N:10°50′E], 23.x.1914, 12.xii.1914, 30.vii.1920, A. I. Good (CNCI). ZAÏRE: 1 ♀, Bengamisa, Stanleyville [00°58′N:25°11′E], 10.ix.1946, J. Verbeke (ISNB); 1 ♀ 7 ♂, Mbau, North Kivu [00°38′N:29°30′E], 8–21.xii.1971, H. Falke, 920 m (CNCI); 1 ♂, Oicha, Beni, Ituri Forest [00°29′N:29°29′E], 17.xii.1948 (CNCI); 1 ♀, Lesse, 00°20′N:29°40′E, 21.vii.1914. C. H. Curran (USNM); 1 ♀, Rumangabo [01°20′S:29°21′E], vi.1946, University Central Africa Expedition 1946–47 (UZMD); 1 ♀, Babadi 'c5°34′S:23°39′E', 27.xi.1974, R. Baker (BMNH); 1 ♂ (*G.melanura* **holotype**), '♂'; 'Popocabacca [=Popokabaka 05°42′S:16°35′E], / F. Loos'; 'M.Bezzi det. 1908: / Graptomyza [hand written] / melanura Bezzi [hand written]'; 'TYPE' [pink label]; 'cf. Ann. Soc. Ent. Belg. / v.52(1908) p.381' [hand written]; 'Graptomyza / melanura / ♂ u.Y.' [hand written & folded in four] (ISNB); 1 ♀ 1 ♂, North of Lac Kivu, Rwankwi [ca. 02°00′S:29°10′E], v.1948, J. V. Leroy (CNCI). UGANDA: 1 ♀, Kawanda [00°26′N:32°32′E], 22.viii.1964, D. J. Greathead (BMNH); 2 ♂, Mpanga Forest, Toro [00°30′N:30°17′E], v–vi.1956, van Someren (BMNH); 1 ♀, Jinja [00°27′N:33°14′E], iii.1940, A. F. J. Gedye (NMKE); 2 ♀, Kampala [00°19′N: 32°35′E], 7.ix.1939, H. Hargreaves (BMNH, CNCI); 1 ♀ 1 ♂, Kilembe, Ruwenzori Range [00°12′N:30°00′E], xii.1934–i.1935, F. W. Edwards (B.M. E. Afr. Exp.), 4,500 ft (BMNH); 2 ♀ 2 ♂, Entebbe [00°04′N:32°28′E], 13.xii.1934, 5.xii.1971, 27.vi.1972, F. W. Edwards, H. Falke, Malaise trap, in forest (BMNH, CNCI); 1 ♀ 1 ♂, 7 mls N. Entebbe [ca. 00°04′N:32°27′E], 1.ii.1972, 5.xi.1972, H. Falke, 1135 m (CNCI); 1 ♀, Near Entebbe [ca. 00°04′N:32°27′E], 1–14.ii.1973, H. Falke, 1160 m (CNCI); 1 ♂, Rwashamaire [00°50′S:30°09′E], 1–15.i.1973, H. Falke, 1220 m (CNCI); 1 ♀, Baunga [?], ±22.v.1926, JLR [collector? almost illegible] (BMNH). GABON: 1 ♂, Fernand-Vaz [01°27′S:09°11′E], ix.x.1902, L. Fea (MCSN). KENYA: 1 ♀, Ngong [01°22′S:36°39′E], iv.1935, G. van Someren (BMNH); 1 ♀, West Pokot, Chepareria [01°21′N:35°12′E], 4–5.xi.1983, A. Freidberg (USNM); 1 ♀, Cherangani Hills, Kapcherop [01°15′N:35°27′E], 2.xi.1983, I. Yarom (USNM); 1 ♂, Mt. Elgon Lodge [01°08′N:34°33′E], 1–6.xi.1983, A. Freidberg (USNM); 1 ♀, Kakamega Forest [00°16′N:34°53′E], 8–9.xi.1983, A. Freidberg (USNM). TANZANIA: 1 ♀, Mount Meru [03°14′S:36°45′E], vi.1962, 1800 m (SMNS); 2 ♀, 3 ♂, Usangi Pare Geb. [04°00′S:37°45′E], 25.v–8.vi.1952, D. O. Afrika Exp (SMNS); 1 ♀ 2 ♂, East Usambara Mountains, Amani [05°06′S:38°38′E], 29.xi.1935, 10.vii.1980, 5.viii.1979, N. L. H. Krauss, M. Stoltze & N. Scharff, 1000 m (BMNH, UZDM); 1 ♀, Makoa [Makoja? 05°13′S:33°33′E], 6.iv.1959, Lindner 'Lichtfung 15.IV / Anzablannied: / noeilslich bulb. Pfl. / in Makoa - Schlucht' [hand written] (SMNS); 1 ♂, Uluguru Mountains, Kimbosa Forest [Kimboza Forest Reserve? 07°02′S:37°47′E], 18.vii.1981, M. Stoltze & N. Scharff, 250 m (UZMD).

ANGOLA: 1 ♀, Nova-Gaia [=Cambundi-Catembo 10°09'S:17°13'E], 14–21.xii.1957, G. H. Heinrich (CNCI). MALAŴI: 2 ♀ 2 ♂, Mlanje [15°57'S:35°36'E], 30.v.1913, S. A. Neave (BMNH, CNCI); 1 ♂, Livingstonia [10°36'S:34°07'E], 21.iv.1913, R. C. Wood, 4400 ft (BMNH). MOZAMBIQUE: 4 ♀, Bwamba valley [Bwabwa River valley? 14°14'S:38°30'E], vii.1945, 7.viii.1946, van Someren (CNCI); 2 ♀, Gorongoza Mountain, Manica-Sofala District [18°24'S:34°06'E], ix.1957, Stuckenberg, 840 m, gallery forest (NMSA).

Discussion: *G. liberiae* Greene, 1949 (from Liberia) was overlooked in the Afrotropical Catalogue (Smith & Vockeroth 1980). Thompson (*pers. comm.* 1990) suggested the possible synonomy of this name with *G. trianglifera*. It is recorded here for the first time as Afrotropical and as a synonym of *G. triangulifera*.

P. H. van Doesburg Snr (1955*a*) has recorded this species from Rwanda and gave the following data: 5 ♀ 3 ♂, Contr. Est Muhavura [01°23'S:29°40'E], 28.i.1953, 2100m; 1 ♀ 1 ♂, Ruhengeri [01°30'S:29°38'E], 27.i.1953, 1900 m; 4 ♀ 2 ♂, Mount Mbude, S. dulac Luhondo [01°30'S:29°45'E], 29.i.1953, 2000 m (MRAC or private collection?). I have not been able to examine these specimens.

Graptomyza varia (Walker, 1849)

Figs 84, 91, 98, 105, 112 & 125

Microdon varius Walker, 1849: 540.
Graptomyza varia: Bezzi, 1915: 56; Curran, 1927: 49; Curran, 1938: 14; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *varius* = coloured, spotted or variegated, referring possibly to markings.

Redescription: Based on male lectotype.

Body length: 7,00 mm; wing length: 6,00 mm.

Head (Figs 84 & 91): Pale yellow, with pale brown markings. Frons slightly depressed where brown. Facial concavity shallow, bare. Facial tubercle gibbose, with 1 bump sharply angled distally. Epistome not projecting beyond facial tubercle. FH ratio 0,35:1. Antenna pale yellow brown, slightly darker dorsally. Setae dark brown on A.s.1, pale on A.s.2. Aristal vestiture longer than width of arista at base on dorsal and ventral surfaces. A.s.3 4,90 times longer than wide, terminally rounded, with fine pale brown pruinosity. Outer sacculus oval, small 0,04 × 0,02 mm, pale yellow with margin brown. Inner sacculus smaller 0,03 × 0,02 mm, situated one-quarter the length and midway on width of A.s.3.

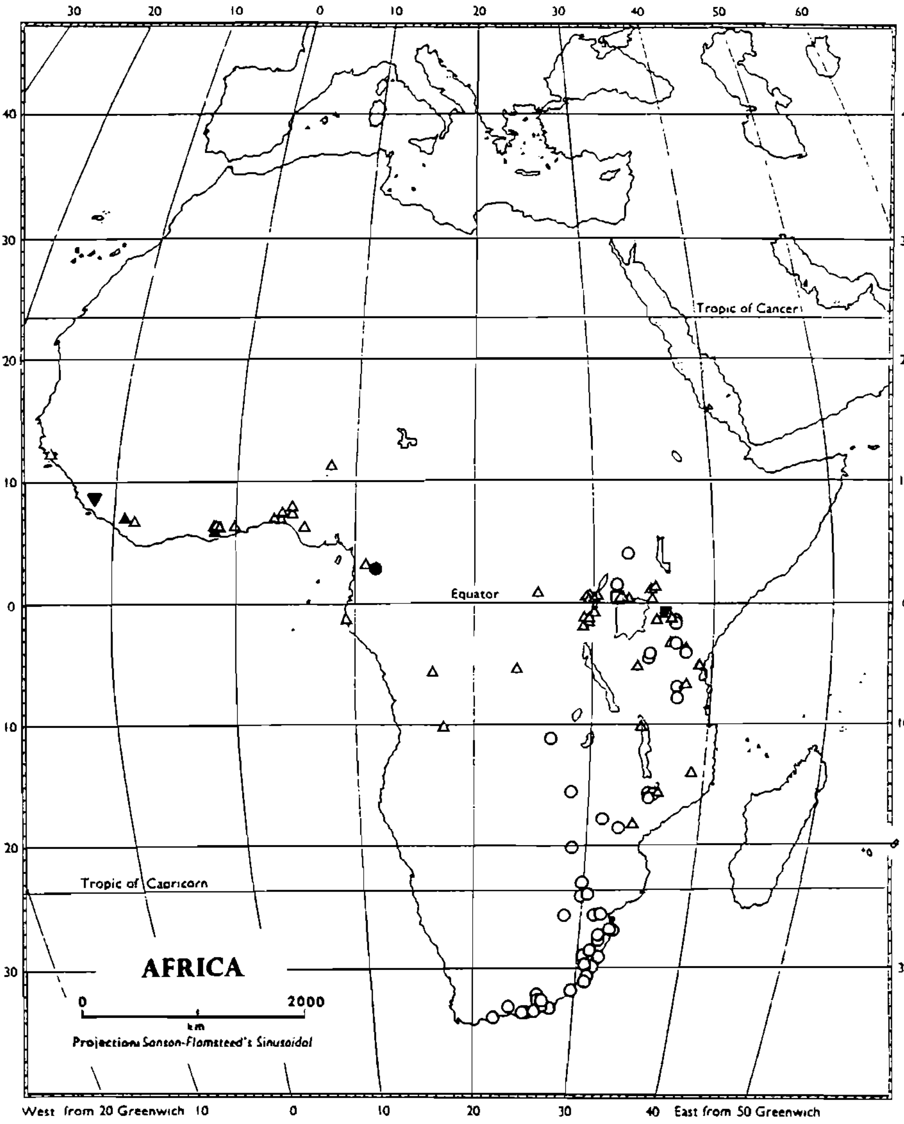
Thorax: Pale yellow; pale orange brown on hind margin of scutum, scutellum and pleurites. Scutellar depression large (Fig. 112) 0,64 × 0,34 mm, shallow and filled with silver setae. Small patch black setae on anterior anepm. Well developed black macrosetae as follows: 1 npl, 4 spal.

Legs: Pale yellow, with pale brown as follows: fore and mid femora (except apex), hind femur except base and hind tibia. Single distal spine on hind tibia, poorly developed (Fig. 98). Setae long, pale, but brown on brown parts of legs. Empodium without plumosity.

Wing: Base of costa with 3 brown macrosetae. Dorsal surface of Rs proximal to

R_1 branch with 11 long setae on left wing. Following cells lack microtrichia: entire ac, base of sc, br and cup. Wing hyaline, infuscation brown (Fig. 105). Plumule poorly developed, pale brown. Haltere creamy white.

Abdomen: Crushed in lectotype. Largely pale yellow with brown markings: T1 with 2 semi-circles on hind margin; T2 with 2 dorsocentral bands and a central square mark of dark brown; T3 with 2 dorsocentral bands; T4 almost wholly ochre with 2 dorsocentral semi-circles of brown. Genital shield well developed.


30
20
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0
10
20
30
Tropic of Cancer
Equator
Tropic of Capricorn
AFRICA
0
2000
km
Projection: Sanson-Flamsteed's Sinusoidal
West from 20 Greenwich
East from 50 Greenwich

Fig. 125. Distribution of *varia* species group. ■ = *G. nigricavum*, ○ = *G. signata*, △ = *G. triangulifera*, ▼ = *G. varia*, ▲ = *G. xanthopoda*, ● = Undescribed sp. 2, □ = Undescribed sp. 3.

Lectotype (here designated): SIERRA LEONE: ♂, 'Syn - / type' [circular label with blue margin]; 'Type' [circular label with green margin]; '38. / 11. 8. / 260.' [circular label]; 'Sierre Leone / pres. by / D. F. Morgan / 38.11.8.260' [hand written]; 'Microdon / varius / Walk.' [hand written]; 'LECTOTYPE / Microdon varius / Walker, 1849 / designated: A.E. Whittington' [red framed rectangular label, printed in black, remainder in my hand writing] (BMNH). The lectotype is in poor condition, the right wing is crumpled and broken, the right hind leg lacks tarsi, the thorax and abdomen are crushed and the latter lacks a venter and genitalia.

Discussion: Walker's 1849 description is obviously based on more than one specimen. The description is such that no decision can be made as to whether the specimen examined was the one chosen by Walker as the type, or the one chosen to provide the *Var* β data and thus excluded from the type series. Since this is the only specimen of this species known, it is hereby designated as lectotype.

Graptomyza xanthopoda Bezzi, 1915

Figs 85, 92, 99, 106, 113, 119, 125

Graptomyza xanthopoda Bezzi, 1915: 57, 56; Curran, 1927: 49; Curran, 1938: 14; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: Gr. ξανθος (xanthos) = yellow, Gr. ποδα (poda) = feet or legs, referring to the totally yellow legs.

Redescription: Based on female holotype.

Body length: 6,03 mm; wing length: 5,27 mm.

Head (Figs 85 & 92): Dark yellow with brown markings, darkening to black on apical lobes and over ocellar triangle. Facial concavity well developed, tubercle gibbose with elongate bump. Epistome projecting the length of A.s.3. FH ratio 0,31:1. Antenna grey brown, A.s.1 and A.s.2 ochre, A.s.3 orange basally on outer surface and along ventral margin of inner surface. Arista brown, vestiture longer than width of arista at base on dorsal and ventral surfaces. A.s.3. with fine silver pruinosity; 3,6 times longer than wide. Outer sacculus ochre, oval, large 0,05 × 0,03 mm. Inner sacculus small, deep, circular 0,02 mm, with ochre margins and protruding dorsal margin. Setae absent on central area of face between antennae and facial tubercle.

Thorax: Black; pale yellow on lateral and hind edges of scutum, npl, ktg, anatg; brown on prepst, anepm, kepm, central portion of proximal scutellum margin and dorsal surface of hind coxa; ochre on remainder of scutellum (Fig. 113) and dorsal half of sbsctl. Scutellar depression large (Fig. 113) 0,40 × 0,24 mm, dark brown, pitted, with recumbent pale brown setae, erect and meeting as a tuft on hind margin. Two npl macrosetae. Subscutellum with fine silver pruinosity.

Legs: Pale ochre. Setae pale golden, black distally on dorsal and posteroventral areas of hind tibia. Five black spines anteroventrally and 8 less distinct golden macrosetae ventrally on hind tibia (Fig. 99). Distal half of hind basitarsus and all tarsomeres with ventral setae dense and thickened. Empodium not plumose.

Wing: Base of costa with 1 black macrosetae. Dorsal surface of Rs proximal to R_1 branch with 14 long setae on each wing. Pterostigma yellowish, slightly darkened over proximal and distal thirds by first 2 bands of infuscation. Following cells lack microtrichia: asc, sc and ac, base of c, r_1, br, and cup. Wing membrane hyaline, infuscation smoky brown (Fig. 106). Haltere pale orange brown.

Abdomen (Fig. 119): Dark ochre, with following dark brown markings: on T2, T3 and T4 an indistinct inverted 'v'-shape medially, across whole width, a band (broadening distally) between this and lateral margin. Setae pale golden, black on dark parts and as semicircular lobe each side of midline on posterior margin, not meeting medially and not extending to lateral margins on T1. Genital shield well developed.

Holotype: GHANA: 1♀, 'Holo- / type' [circular with red margin]; 'Graptomyza [hand written] / Type / xanthopoda [hand written] / Bezzi [hand written]' [circular label with orange margin]; 'Obuasi, / Ashanti, / W.Africa. [06°12'N:01°40'W] / 23.vi [hand written] 1907. / Dr. W. M. Graham. / 1908-245'; 'Graptomyza / xanthopoda / n.sp. / type ♀' [hand written on folded brown paper] (BMNH). In good condition, but head glued on, fore tarsi and left arista missing.

Additional material examined: LIBERIA: 1 ♀, Kpaine 07°10'N:09°07'W, 1.x.1953, Dr. W. Peters, 1400 ft (BMNH).

Undescribed sp. 2

Figs 86, 93, 100, 107, 114, 120 & 125

Material examined: CAMEROON: 1 ♀, Fulasi [02°58'N:11°57'E], xii.1913, collector unknown (CNCI).

Discussion: The arrangement of hind tibial spines (Fig. 100) of this specimen closely resembles those of *G. triangulifera*. The following differences distinguish this specimen: Body length: 7,37 mm; wing length: 6,13 mm. Face in profile slightly more gibbose (Fig. 86) and narrower in dorsal view (Fig 93). Outer sacculus large (0,05 mm). Scutellum completely pale, scutellar depression moderate (0,38 × 0,50 mm) (Fig. 114). Wing infuscation similar (Fig. 107). Abdominal markings open chevrons rather than closed triangles (Fig. 120). Based on this single damaged female, the evidence for a new species is insufficient to warrant description. Attention is however drawn to this specimen, which may represent a species close to *G. triangulifera*.

Undescribed sp. 3

Figs 87, 94, 101, 108, 115, 121 & 125

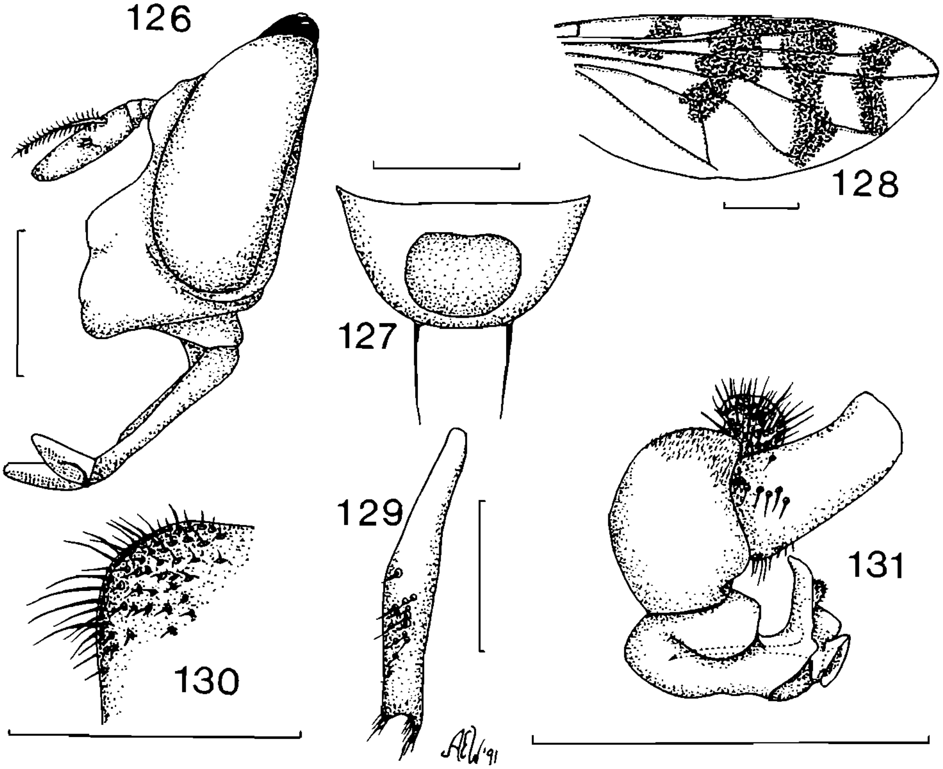
Material examined: UGANDA: 1 ♀, Kampala [00°19'N:32°35'E], 7.ix.1939, H. Hargreaves (BMNH).

Discussion: The shape and colouring of the head (Figs 87 & 94) of this specimen resemble those of *G. triangulifera*, although in dorsal view the head is slightly wider than that of *G. triangulifera*. The arrangement of spines on the hind tibia resemble those of *G. xanthopoda*. The following character states distinguish this specimen from both species: Body length: 7,60 mm; wing length: 6,07 mm. Scutellar depression moderate (0,35 × 0,24 mm), deep and bordered on posterior margin by row of inward directed setae (Fig. 115). Hind tibia with 2 centrally positioned spines (Fig. 101). Wing infuscation (Fig. 108). Abdominal markings open chevrons (Fig. 121).

Two specimens of *G. triangulifera* were collected at the same locality on the same date, also by Hargreaves, but are clearly different. The specimen examined above bears the hand written manuscript label 'Holotype / Graptomyza / ugandana / Hull'. Although I agree with Hull that this single damaged female probably represents a new species, I refrain from describing it because of the inadequacy of the material.

suavissima species group

Diagnosis: Body colouring dark blue (sometimes iridescent; frons orange). Entire frons strongly depressed. Macroseta on A.s.2 short and weakly developed. No notopleural macrosetae. One scutellar macroseta. Loop of R_{2+3} with small petiole (sometimes reduced or absent) (Fig. 128). Cell dm with adjacent veins (M and CuA_1) curved outwards (Fig. 128). M curved towards margin near petiole of



Figs 126–131. *G. suavissima*. 126. Head, lateral view. 127. Scutellum, dorsal view. 128. Wing pattern. 129. Hind tibia, ventral view. 130. T2, anterodorsal margin. 131. Male genitalia, lateral view. (Scale bars = 1 mm).

r_{4+5} such that M_1 is re-entrant (Fig. 128). Microtrichia of wing predominantly over infuscation, basal patch at junction of Rs and R_1 long and dense. Leading edge of T2 with small group of black macrosetae (Fig. 130). Genital shield well developed, with 2 lateral spines and 1 smaller median spine. Genitalia distinct (see description and Fig. 131).

Included species: *G. suavissima* Karsch, 1888.

Discussion: *Graptomyza suavissima* is sufficiently different to suggest that it forms a monotypic clade, distinguishing it from all other Afrotropical taxa.

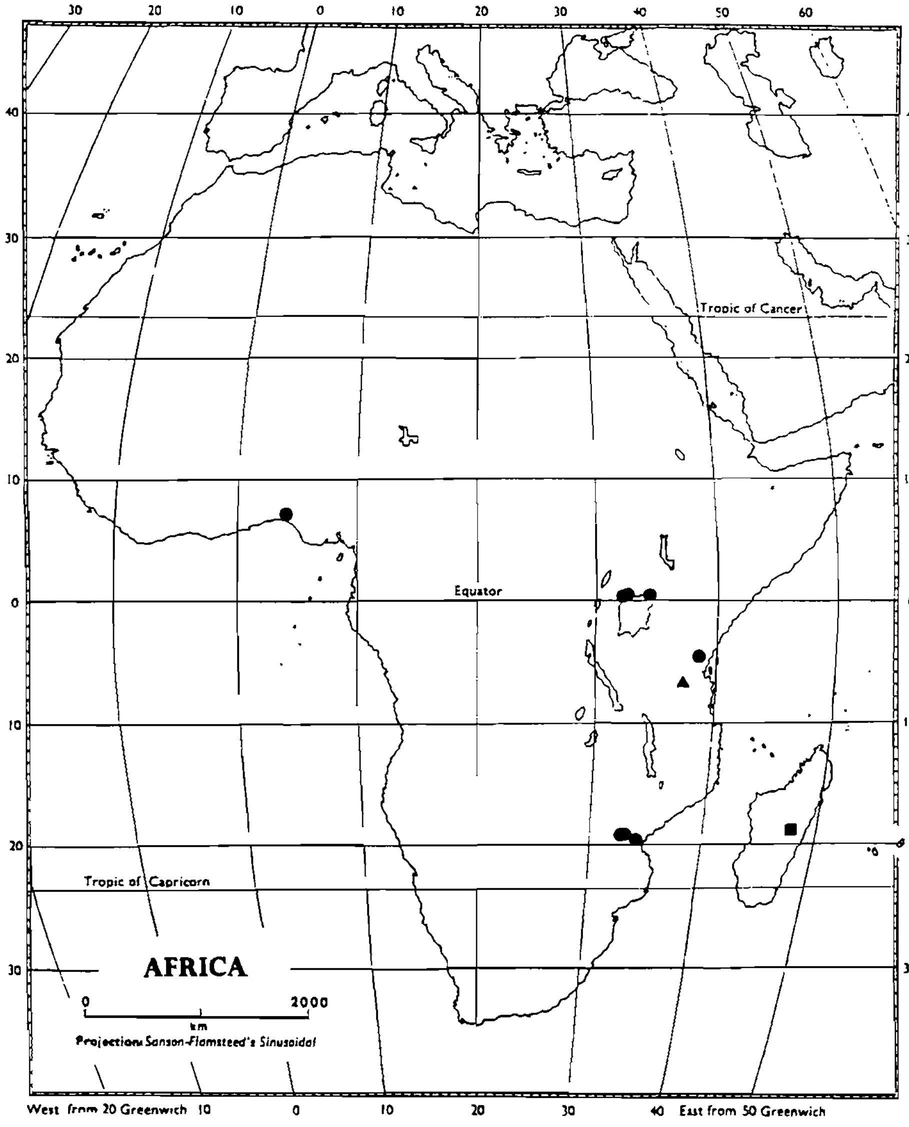

30 20 10 0 10 20 30 40 50 60
40
30
20
10
0
10
20
30
Tropic of Cancer
Equator
Tropic of Capricorn
AFRICA
0 2000
km
Projection Sanson-Flamsteed's Sinusoidal
West from 20 Greenwich 10 0 10 20 30 40 East from 50 Greenwich

Fig. 132. Distribution of ● = *G. suavissima*, ■ = *G. hova* and ▲ = *G. quadrifaria*.

Examination of some non-Afrotropical species of *Graptomyza* indicate that permutations of most of the characters of the *suavissima* group are shared with one or more Oriental or Australasian species. Consequently *G. suavissima* could prove to be an Afrotropical representative of a mainly Oriental clade.

Distribution: As indicated (Fig. 132), *G. suavissima* is disjunctly distributed in West and East Africa. This distribution is remarkably similar to the puzzling distribution found by Barraclough (1985) for *Bogosia rubens* (Villeneuve, 1923) (Diptera: Tachinidae). The reason for the lack of specimens from central Africa is unclear.

Graptomyza suavissima Karsch, 1888

Figs 126–131 & 132

Graptomyza suavissima Karsch, 1888: 382; Bezzi, 1912: 413; Bezzi, 1915: 55; Curran, 1927: 49; Curran, 1938: 14; Kertész, 1910: 205 (catalogue); Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *suavis* = delightful, L. *-issimus* = superlative case, ie. the most delightful.

Redescription: Based on male holotype.

Body length: 7,73 (6,13–7,86) mm; wing length: 7,20 (6,00–7,40) mm.

Head (Fig. 126): Orange, darkened to brown over frontal margin of epistome, frons and vertex. Bands across gena indistinct (absent in some specimens), pale brown. Facial tubercle prominent. Epistome short, projecting no further than A.s.3, broadly notched. Eye dark grey with very short pile of white setae. FH ratio 0,30:1 (0,19–0,30:1 ♂; 0,29–0,32:1 ♀). Antenna orange. A.s.1 and A.s.2 with apical crown of short white erect setae, interspaced with few dark setae. Aristal vestiture longer than width of arista at base. A.s.3 with long dense silver pruinosity, 2,78 (2,23–3,43) times longer than wide. Sacculus oval, deep, centrally situated. Setae white, those of frons and vertex curving outwards from centre of frons, those between facial tubercle and epistome short and white.

Thorax: Black; vaguely iridescent blue on scutum; dark brown on scutellum, hind coxa, and pleurites and sometimes sbsctl. Transverse suture deeply indented in npl area. Scutellar depression wide (Fig. 127) 0,94 × 0,94 (0,61–1,06 × 0,42–0,94) mm, shallow and oval, with short recumbent bronze coloured setae. Setae of thorax white (black on scutellum), alveoli raised, black. Two anepst, 1 sctl (Fig. 127) and a few setae on scutum hind margin and scutellum between macrosetae.

Legs: Dark brown, each segment darker distally, orange on hind femur and tibia on median three-fifths. Setae dark brown to black. Hind coxa with long conspicuous white setae. Tibiae terminating in ventral fringe of short dark brown setae. Hind tibia with short macrosetae (Fig. 129).

Wing: Base of costa with clump of well developed black setae. Dorsal surface of Rs proximal to R_1 branch with 6 (7) long setae on right wing and 7 (8) on left wing (frequently difficult to locate). Infuscation (Fig. 128) predominantly coincident with microtrichia. Calypters smoky grey, covered with dense black microtrichia and having brown marginal band; marginal setae short, black. Plumule dark brown. Stem of haltere dark brown basally, cream apically, knob creamy yellow.

Abdomen: Iridescent violet and blue (brown tinged in some specimens), setae short, white with raised alveoli. Genitalia (Fig. 131): Cercus quadrate, with anterodorsal angle acute. Surstylus large, blunt, sparsely setose at base. Hypandrium with large dorsal bulge near junction with epandrium, aedeagal guide absent. Paramere wide and notched disto-basally, vertical, but directed anterodorsally towards apex. Basiphallus stout, widely open apically as indented cone. Distiphallus cone-like and pointing anteriorly. Paired gonostyli terminally setose.

Holotype: TANZANIA: ♂, 'Usambara [Usambara mountains? 04°45'S:38°30'E] / C. W. Schmidt / Febr - Marz [18]86.'; '13853'; 'TYPE' [orange paper]; 'Graptomyza / suavissima N' [hand written]; 'Zool. Mus. / Berlin'; 'HOLOTYPE [printed in red] ♀ / Graptomyza suavissima / Karsch 1888 / det. A. E. Whittington' [rectangular red framed label, my hand writing] (ZMHB). In good condition.

Additional material examined: NIGERIA: 2 ♂, Olokemeji, Ibadan [07°20'N:04°03'E] (BPBM). KENYA: 2 ♀ 2 ♂, Kakumega, Yala River [Kakamega forest reserve? 00°16'N:34°53'E], i–ii.1916 [deleted], H. J. A. Turner (NMKE; BMNH). UGANDA: 2 ♀, Entebbe [00°04'N:32°27'E], 7.x.1971, H. Falke, with mites (CNCI); 1 ♀, Kawanda [00°26'N:32°32'E], vi.1972, D. J. Greathead, on flowers (BMNH). MOZAMBIQUE: 1 ♂, Siluwe Hills west of Beira [precise locality not known], 14.iii.1964, D. Cookson (NMSA). ZIMBABWE: 1 ♂, E. Vumba [19°05'S:32°45'E], 1.vi.1964, D. Cookson (NMSA); 4 ♀ 1 ♂, Bomponi, Vumba [19°06'S:32°53'E], 13.iv.1963, 13 and 16.vi.1965, D. M. Cookson (NMSA).

incertae sedis species

Graptomyza hova Keiser, 1971 and *G. quadrifaria* Szilády, 1942 were known from unique holotypes, which have unfortunately been lost and destroyed respectively (see discussion below). The following are translations of the original descriptions.

Graptomyza hova Keiser, 1971

Fig. 132

Graptomyza hova Keiser, 1971: 260; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: Hova is a name often used for the Merina tribe of central Madagascar, incorrectly, as 'Hova' should be applied to the commoners or ordinary people in contrast to the 'Aristocracy'. Keiser used the name because of the collection locality on the central plateau.

Translation of original description from German: '♀. Head bright yellow, glossy. Vertex and coarsely punctured frons glossy dark brown, with a pair of smaller, dull yellow side-spots close to the eye margin. One light brown, barely noticeable band from mouth edge across median tubercle ending at flat facial plain; 1 pair obscure brown streaks from under eye margin towards mouth margin. Setation on frons yellow, just as on the facial protrusion; lower half of median band ending on brown facial tubercle by a transverse row of black macrosetae. Eyes with very short, yellow brown setae. Antennal segments 1 and 2 short; the third segment reaching as far as transverse setae on median tubercle, upper margin is straight, lower margin strongly curved; upper half of segments 2 and 3 darkened, lower part yellow. Setae brown, with yellowish bases and extremely short pruinescence.

Mesonotum yellow, glossy, the pleura, except the yellowish propleuron, glossy black. Humeral callosity pale yellow and a larger spot on mesopleuron. Setation of mesonotum short, pale yellow; on 1 margin are a few longer black macrosetae (not so long and strong as on *robusticornis*) and over the hind margin only 2 black macrosetae, of which the outer pair are larger and stronger than the inner pair; 1 black macroseta on hind margin of mesopleural spots, pleural setation otherwise pale yellow. Scutellum black to dark brown, glossy, the hind margin and central spot on broad fore-margin faint yellowish; depression only feebly glossy. Longer macrosetae project over the short black marginal setae.

Abdomen yellow, with black median band. This begins small at the foremargin of tergite 2, widening towards hind margin, but not reaching it; beginning on tergite 3 it is wider than tergite 2 and ends likewise proximal to the hind margin; on tergite 4, the apical half of which is stained reddish yellow, it ends on middle. From the black margin of tergites 2 and 3 extend short black hind margin bands, but interrupted before middle band. Setae short, recumbent, pale yellow, darker over the dark parts. Ventrum pale yellow, the sternites glossy.

Coxa 1 yellow, both of the others with fore edge yellow, hind edge black. Fore and middle legs totally yellow. Basal half of the strong hind femur yellow, apical half faint reddish-yellow; slightly thickened hind tibia and metatarsi as well as remaining tarsal segments reddish-yellow. Setae of legs yellow, only on outside of hind femur extend some short black setae towards the apex.

Wings hyaline, iridescent; 1 marginal spot, and 2 below opening of r_1 at R_1 and R_3 [division of R_1 and R_3] and over tm [dm] recognisable as murky grey. Costa without macrosetae, while there are some present on the basal part of r_{2+3} [R_{2+3}?].

Calypter white with pale yellow margins and marginal setae.

Haltre white to pale yellow.

Length: 4 mm.

Holotype ♀: Central plateau: Tananarive (Tan.), 15.4.58.' [18°55'S:47°31'E] (Fig. 132).

Discussion: The holotype cannot be found. Dr L. Matile of the Museum Nationale d'Histoire Naturelle (MNHN) reports (*pers. comm.*, 25 March 1991) 'It appears that this type has disappeared from the box in which all Keiser's holotypes of Syrphidae are kept...It seems that this type has been borrowed without loan form...'

Graptomyza quadrifaria Szilády, 1942

Fig. 132

Graptomyza quadrifaria Szilády, 1942: 96; Smith & Vockeroth, 1980: 497 (catalogue).

Etymology: L. *quadrifarius* = in four parts.

Translation of original description from German: 'Nearest relative of *G. vittigera* Big., but with the following distinctions. Face pale yellow with single black median band and similar cheek stripes. Frons glossy black, but surrounding of antennal base (limited by the straight margin of frons) and 2 lateral spots remain bright yellow. Thorax yellow only on humeral callosity, the large mark, notched on each side of postsutural area and pleura and transverse suture overlapping scutum. Scutellum with central glistening dark brown middle depression surrounded by a yellow ridge. Legs pale yellow, distal half of hind femur and hind tibia black, except at the base of the latter. Markings of the abdomen unequal; laterally joined together in a single narrow side-band, second pair uniform in front of anterior margin of tergite 2, diminished from and behind anterior to hind margin of tergite 4; the median band dilated to a small triangle pointing backwards and on tergite 2 joined to one a other in one equilateral triangle, but rounded on top, surrounded by smaller triangular spot of base colour, but separated from upper edge for about one-third the segment-length by yellow base colour. At the hind margin of tergite 1 there are only 2 triangles, and some partial borders. Abdomen covered with long white inclined setae. Body length 6 mm.'

Material examined (by Szilády): Kimamba V. (Coll: Herr K. Katona-Kittenberger; Tanzania 06°47′S:37°08′E) (Fig. 132).

Discussion: The holotype has been destroyed. Mrs A. Dely-Draskovits of the Zoology Department, Hungarian Natural History Museum (HNHM) states (*pers. comm.*, undated) 'Our collection was burnt out in 1956. At this time many types were lost. You will no longer find the type of *Graptomyza quadrifaria* Szilády.'; Dr L. Papp of the same department (*pers. comm.*, 25 March 1991) '...almost all the old collection of the HNHM in Diptera...were destroyed by fire here in 1956...I have checked all boxes of our Syrphidae collection but in vain. We have not any more information on the types so I think they must have been lost.'

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